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A, The first letter of the alphabet in most languages. It has three sounds: the first is the short sound, as in *flat*; the second is the long, as in *made*; the third is broad, as in *fall*, *talk*, &c. In grammar A is an article, and denotes one, *as a man*. In music A is the nominal of *the sixth note* in the gamut: also the name *of one of* the two natural moods, and the *open note* of the second string of the violin.

The Romans used A as a numeral for 500, and with a dash over it, Ā 500,000.

The letter *A* is used by merchants for *accepted*. A. M. stand for *anno mundi*, the year of the world; also *artium magister*, or master of arts; and *ante meridiem*, or *before noon*; A. B. bachelor of arts; A. C. for *ante Christi*, or before Christ; A. D. for *anno domini*; A. U. C. for the year from the building of Rome.

AAM, *or* HAUM, a Dutch liquid measure containing 288 English pints.

AB, the eleventh month of the civil and the fifth of the ecclesiastical year of the Jews; answering to the end of July and the beginning of August.

ABACA, a kind of flax or hemp which grows in the Philippine islands.

ABACK, in marine language, the situation of the sails when, from being full, they are brought flat to the mast.

ABACOT, a cap of dignity formerly worn by English kings.

ABACUS, in architecture, the upper part of the capital of a column. In the Tuscan, Doric, and Ionic orders it is flat and square; but in the other orders its four sides are arched inwards with a rose in the centre. The invention is attributed to Callimachus; who seeing a basket covered with a tile over the root of an acanthus plant which grew on the grave of a young lady, was so struck with the appearance, that he executed a capital in imitation of it, in which the tile was represented by the abacus, the leaves of the acanthus by the volutes, and the basket by the body of the capital.

ABACUS, or ABACISCUS, in antient architecture, certain compartments in mosaic pavements.

ABACUS, a table strewed over with dust, on which the antient mathematicians delineated their diagrams.

ABACUS, *in arithmetic, an instrument* for facilitating calculations by means of counters.

ABACUS *Pythagoricus*, a multiplication table, or a table of numbers ready cast up.

ABACUS *Logisticus*, a kind of multiplication table in the form of a right angled triangle, each side having the numbers from 1 to 60, and the area the product of each two opposite numbers.

ABACUS, an antient musical instrument for dividing the intervals of the octave.

ABAFT, any thing situated towards the stern of a ship. *Abaft the beam*, is the situation of any object with a ship when it is in that part of the horizon contained between a line at right angles with the keel and the point of the compass opposite to the ship's course.

ABAGI, or ABASI, a silver coin in Persia and Georgia, valued at about eighteen pence.

ABALIENATUS, a physical term, which when applied to any part of the body, denotes that the same must be cut off; and when to the senses, it expresses their total destruction.

ABASED, or ABAISSE, in heraldry, a term applied to the wings of eagles, when they incline downwards to the point of the shield.

ABATAMENTUM, in law, is when a person dying seised of an estate, another person takes possession before the lawful heir.

ABATE, a law term, signifying to overthrow, to destroy: also applied to one who enters upon an estate in prejudice of the right heir.

ABATEMENT, in heraldry, a mark added to disgrace coat armour. In law, the rejecting a suit through an error in the proceedings. Among traders, the same as discount. In the customs, an allowance made in the duty on damaged goods.

ABATIS, in fortification, the placing felled trees to impede the progress of an enemy.

ABATOR, in law, an intruder who takes possession of an estate, to the hindrance of the lawful heir.

ABB, among clothiers, means the yarn of a weaving warp.

ABBA, a Syriac term signifying father. *Among the Jews* it was a title of dignity;

and the eastern Christians apply it to their bishops.

ABBE, a term formerly given in France, to persons who were candidates for church preferment.

ABBESS, the superior of a convent, or house for religious women.

ABBEY, a religious house in Roman Catholic countries. At the Reformation, 193 abbies were dissolved in England, the revenues of which amounted to £2,853,000 annually.

ABBOT, the superior of an abbey. Mitred abbots were those who enjoyed episcopal jurisdiction. Croziered abbots were those who carried a crozier, or pastoral staff. Oecumenical abbot was a title assumed among the Greek Christians and signifies universal.

ABBREVIATION, the contracting of a word or sentence, by omitting some of the letters, or substituting characters in their place.

ABBREVIATION *of Fractions*, the reducing them to lower terms, as $\frac{24}{36}=\frac{8}{12}=\frac{2}{3}$ and $\frac{9abx}{3bc}=\frac{3ax}{c}$

ABBREVIATORS, persons at Rome who prepare the pope's briefs and reduce his grants into a proper form.

ABBREUVOIR, in masonry, indentures made in stones and filled with mortar to cement them together.

ABCEDARY, or ABECEDARIAN, a term sometimes applied to school-masters. It means, also, those compositions, the parts of which are ranged in alphabetical order; as the 119th psalm in Hebrew.

ABDICATION, the relinquishment of a public office, as when James II. withdrew from the kingdom in 1688, the convention parliament voted that he had *abdicated* the throne. Among civilians it is the act of a father in discarding his son. The Romans applied the word to those citizens who renounced their freedom and became slaves.

ABDOMEN, the lower part of the belly, from the thorax to the bottom of the pelvis.

ABDOMINALES, or *Abdominal Fishes*. The fourth class of animals in the Linnean system.

ABDUCTION, in logic, a mode of arguing in which the greater extreme is contained in the medium, but the medium not in the lesser extreme. In surgery, abduction is the fracture of the bones by which the broken parts recede from each other.

ABDUCTOR, or *Abducent*, in anatomy, a term applied to some of the muscles on account of their contracting or opening the parts to which they belong.

ABELMESAH, the musk seed, used as a perfume; it grows in Egypt and the West Indies.

ABEL TREE, a species of the poplar, having very large leaves.

ABERRATION, in optics, a deviation of the rays of light when inflected by a lens or speculum, whereby they are prevented from uniting in the same point. There are two kinds, one proceeds from the figure of the glass or speculum, the other from an inequality in the refrangibility of the rays themselves. This last is termed Newtonian from the name of the discoverer.

ABERRATION, in astronomy, a small apparent motion of the fixed stars, caused by the progressive motion of light and the earth's annual advance in her orbit. This discovery was made by Dr. Bradley in the course of his observations to determine the annual parallax of the fixed stars. Aberration of a planet, is equal to the geocentric motion of it, or that space in which it moves during the passage of the light from the planet to the earth.

ABETTOR, in law, one who instigates another to commit a crime. In the Scots law it is called *act and part*.

ABEYANCE, ABEIANCE, or ABBAYANCE, in law, the expectancy of an estate.

ABIB, the first month of the ecclesiastical year of the Jews; answering to part of March and April.

ABILITY, in law, is the power or right of acquiring or disposing property.

ABJURATION, in law, a declaration on oath that the Pretender or son of James II. and his issue have no right to the throne of these kingdoms.

ABLATIVE, in grammar, the sixth case of Latin nouns and opposed to the dative. *Ablative absolute* is a word which does not depend on the rest of the discourse.

ABLEGMINA, in the Roman sacrifices, the chosen parts of the entrails of the victims.

ABLUENT *Medicines*, are those which dissolve and carry off acrimonious matter from the stomach and intestines.

ABLUTION, a religious ceremony, still used in eastern countries, consisting in washing the body, before public festivals, or entering the temples. In the Roman church it is the water with which the priest washes after consecrating the host. Among Chemists it is the washing away the superfluous salts of any thing.

ABOLITION, in law and parliamentary language, the repealing some statute or usage.

ABOLLA, a military garment worn by the Greek and Roman soldiers, to keep out the cold.

ABOMASUS or ABOMASIUM, terms used in comparative anatomy for the fourth stomach of ruminating animals.

ABOUT, in marine language, is the alteration of the ship's course. In military tactics *about* signifies a change in the position of a body of troops.

ABRA, a silver coin of Poland, worth about one shilling.

ABRAUM, a kind of red clay used by cabinet makers to colour new mahogany.

ABRAXAS, a mystical term of the gnostics signifying the supreme being, under whom they placed 365 dependent deities. *Abracas* among antiquaries, is an antient gem with that word engraved upon it. It was used as an amulet or charm.

ABREAST, in marine language, denotes the situation of two ships when they lie parallel to each other.

ABRIDGING, in algebra, is the reducing of a compound equation to a more simple form.

ABRIDGEMENT, in literature, is the reduction of a large work to a small compass, by retrenching superfluous words, and extraneous observations, still retaining the spirit of the narrative, or argument. In law, *abridgement* is the shortening of a count or declaration.

ABROMA, in botany, a genus of plants of the class and order of polyadelphia dodecandria. There are but two known species, one the *abroma augusta*, a native of New South Wales and the Philippine Islands; the other of the East Indies. The former bears a purple flower, the other is a shrub.

ABSCEDENTIA, in surgery, denotes such parts of the body which being in a morbid state are separated from the sound.

ABSCESS, an inflammatory tumour, containing purulent matter. It is the same with apostem, imposthume, and impostumation, and is the consequence of inflammation.

ABSCISSA, in conics, that part of the diameter of a curve between the vertex of the diameter and the point where an ordinate or semi-ordinate to the diameter falls. Hence there are numerous abscissas in the same curve, as also of ordinates. In the parabola one ordinate has one abscissa, in an ellipsis two, in an hyperbola of two parts, also two; and in curves of the second and third orders, three or four. In the parabola the abscissa is a third proportional to the parameter and semiordinate. In the ellipsis the square of the semiordinate is equal to the rectangle of the parameter into the abscissa, subtracting another rectangle of the same abscissa into a fourth proportional to the axis, the parameter and abscissa. In the hyperbola, the squares of the semiordinates are to each other as the rectangles of the abscissa into a line formed of the abscissa and transverse axis.

ABSCISSION, in rhetoric, a figure of speech by which the orator breaks off suddenly in the middle of his discourse, to make the deeper impression on his audience.

ABSINTHIUM. *See* ARTEMISIA.

ABSOLUTE NUMBER, in algebra, the pure number in an equation standing alone without literal characters, as $x \times 12 = 24$, in which the absolute numbers are 12 and 24.

ABSOLUTE EQUATION, in astronomy, the sum of the optic and eccentric equations. The optic equation is the apparent inequality of the motion of a planet; and the eccentric inequality proceeds from the uniformity of the planet's motion.

ABSOLUTELY, in grammar, is when a word is subject to no government.

ABSOLUTION, among civilians means a definitive sentence whereby a person is declared perfectly innocent. In divinity it is the forgiving of sins, which power the Roman church claims for the priest; but the protestants deny it, making it only declaratory.

ABSORBENTS, medicines used to dry up superfluous humours.

ABSORBENT VESSELS, in anatomy, a term applied to the lacteals, lymphatics, and inhalent arteries. In botany it is a name used for the fibres of the roots of plants.

ABSORPTION, the effect of absorbing; in chemistry it is applied to the diminution occasioned by the combination of gaseous substances with other gases.

ABSTERGENTS, in the *materia medica* are remedies used for purging the body of concretions and other impurities.

ABSTRACT IDEA, in metaphysics, the idea of a general body or quality considered by itself. *Abstract Mathematics*, or pure mathematics, that which treats of magnitude or quantity, without application to particular objects.

ABSTRACTION, in metaphysics, that action of the mind by which it forms abstract ideas. In chemistry, it is the drawing off by heat one part of a compound from another. When the abstracted part is collected it is termed *distillation* or *sublimation* as the process is wet or dry.

ABUNDANT *Numbers*, in arithmetic, those numbers the aliquot parts of which make more than the numbers themselves.

ABYSS, a deep pit or cavity. It is used in Scripture for hell, or the bottomless pit. Some philosophers suppose that there is a cavity filled with water at the centre of the earth to which they give this name.

ACACIA, in botany, a name improperly applied to several plants: as Guilandia, Guaiacum, Mimosa, Poincena, and Spartium, which terms see. In the antient materia medica acacia was a gum made from the Egyptian thorn.

ACACIA GERMANICA, a juice made of wild sloes. It is a strong astringent, and good for hemorrhages and fluxes.

ACACIA, or AKAKIA, a roll or bag represented on the medals of the Greek and Roman emperors.

ACADEMIC, or ACADEMICIAN, a member of an academy. Among the antient philosophers there was a sect of this name who were the followers of Socrates and Plato, and doubted every thing, hence they were called sceptics.

ACADEMY, was a villa near Athens where the academics instructed their disciples. It was so called from its original owner, Academus, an Athenian citizen. Among the moderns academy usually denotes a society of learned or scientific men, of which there are several throughout Europe and in America, by whose publications and exertions the interests of letters and the arts have been wonderfully extended. In a lower sense the word academy is used in England for schools in general.

ACADEMY *Figure*, in painting, a design made after a model with a crayon or chalk.

ACÆNA, in botany, a genus of the tetandria monogynia class. It grows in Mexico, and is about two feet high.

ACALYPHA, or *Three-seeded Mercury*, in botany, a genus of the monoecia monadelphia class. There are fourteen species of it; some annual, and some shrubs, but neither are sufficiently beautiful or useful to merit cultivation.

ACANACEOUS *Plants*, those which are prickly.

ACANGIS, light horsemen in the Turkish army.

ACANTHA, in botany, the prickles of a thorny plant; and in zoology the spines of particular fishes, as the echinus marinus, &c.

ACANTHOPTERYGIOUS *Fishes*, those fishes which have their back fins bony, and some of them sharp at the extremities.

ACANTHUS, *Bear's Breech*, in botany, a genus of the class and order of didynamia angiospermia. Of this plant there are about ten species; the acanthus mollis or smooth-leaved acanthus was formerly used in medicine. In architecture acanthus is an ornament representing the leaves of that plant on the capitals of columns of the Corinthian and composite orders.

ACARUS, the tick or mite, a genus of insects of the order of aptera, or those without wings. The acarus is oviparous, and has eight legs; two eyes, and two jointed tentacula. It will live many months without food, and is very prolific. There are thirty-five species of this insect.

ACATALECTIC, a term in antient poetry for those verses which have all their feet and syllables without any defect at the end. Those which are not so are called *catalectic*.

ACATALEPSY, in antient philosophy the impossibility of comprehending a thing.

ACATIUM, a boat used by the antients in military affairs.

ACAULOSE or **ACAULOUS**, in botany, a term applied to plants that have no stem.

ACCALIA, among the Romans, were festivals held in honour of Acca Laurentia, the nurse of Romulus.

ACCELERATION, in mechanics, the increase of velocity in moving bodies, Falling bodies obtain their accelerated motion by the impulse of gravity, which gives an augmentation of motion every moment. When this increase is equal in equal times it is called uniformly accelerated motion.

ACCELERATION, in antient astronomy, is a term applied to the fixed stars. The diurnal acceleration is the time by which the stars anticipate the mean revolution in one day. This apparent acceleration of the stars is owing to the retardation of the sun caused by his apparent motion to the east.

ACCELERATION *of the Moon*, the increase of the moon's mean motion from the sun compared with the diurnal motion of the earth, which is about ten seconds in a century.

ACCENSI, supplementary soldiers among the Romans who were to supply the place of those killed or disabled. *Accensi* also signified certain inferior magistrates.

ACCENT, among grammarians, denotes the raising or depressing the voice in speaking or reading. There are three kinds of accents; the acute, the grave, and the circumflex. The acute is thus marked (ʹ) and shews that the voice is to be raised in pronouncing the syllable over which it stands. The grave accent is marked thus, (\`) and means that the voice must be lowered. The circumflex is marked (ˆ or ^) and denotes a quavering of the voice between high and low. In music *accent* is applied to every modulation of the voice, and those notes or parts of a bar are said to be accented on which the emphasis or expression falls. In common language accent is generally used to denote the tone or *manner of speaking* peculiar to certain countries, thus we say the Irish accent, Scotch accent, &c.

ACCENTOR, an old term for the leader in musical performances.

ACCEPTANCE, among merchants, is when a person on whom a bill of exchange is drawn makes it his own either verbally or in writing. Bills payable at sight are not accepted because they must be paid when presented or protested.

ACCESSARY or **ACCESSORY**, in law, one who aids or abets another in the commission of a felony.

ACCESSION, in politics, means the act of a prince when he becomes party in a treaty concluded between other powers. In physic it is synonymous with paroxysm.

ACCESSORY *Nerves*, a pair of nerves, which rising from the spinal marrow in the vertebræ of the neck enter the cranium with the par vagum, and with the same passes out again, and both re-enter the neck and shoulder.

ACCIATURA. a term in music to express the manner in which particular passages are to be performed on the harpsichord.

ACCIDENT, that which does not follow from the nature of a thing but from some qualities of it; also qualities opposed to substances. In heraldry *accident* is an additional mark in coat armour which may be omitted without altering the dignity.

ACCIDENTAL, in philosophy, an effect proceeding from a cause that happens by accident. *Accidental colours* are those which depend on the affections of the eye. *Accidental point* in perspective, that point in the horizontal line where the projections of parallel lines meet the perspective plain.

ACCIPENSER, in ichthyology, a genus of fishes of the order of amphibia nantes. It has a single linear nostril; the mouth is in the under part of the head and without teeth: the cirri are below the snout, and before the mouth. There are three species of this genus; 1. Accipenser Huso the largest, is a native of Russia. The skin is so strong as to be employed for drawing carts. The isinglass of the shops is made from its sounds and scales. 2. Accipenser Ruthenus, is also a native of Russia. 3. Accipenser sturio or the Sturgeon, is frequent in our rivers. It has four cirri, and eleven squamous protuberances on the back. Isinglass is also made of the sounds of this fish. The sturgeon is sometimes found of the length of eighteen feet, and weighing 700 lbs. It is oviparous, and spawns in water.

ACCIPITRES, an order of birds having a crooked beak. In this order are classed the vulture, falco, strix, and lanius kinds; with 72 species.

ACCLAMATION, among the Romans was the public approbation given by the people of the conduct of their princes or generals. Among antiquaries, those medals are called by this name on which the people are represented as expressing their joy.

ACCLIVITY, the ascent of a hill. In fortification it denotes the rampart.

ACCOLADE, an antient mode of conferring knighthood, by the sovereign's embracing the neck of the new-made knight.

ACCOLLEE, in heraldry, is the same as accollade; or sometimes it denotes two things joined together: at others animals with collars, or crowns round their necks; and lastly battons or swords placed saltier-wise behind the shield.

ACCOMMODATION, or ACCOMMODATING, in geometry, the placing of a line or figure into a circle, according to the terms of the problem. In philosophy it is applying one thing to another by analogy.

ACCOMPANIMENT, in music, denotes the instruments which accompany the voice to give it fullness and relief, and to heighten the general effect.

ACCOMPANIMENT, in heraldry, a thing added to a shield as an ornament; it is also applied to several bearings about the principal one.

ACCOMPLICE, in law, is one who is privy to, or aiding in the commission of a crime. In Scotland accomplices cannot be prosecuted till the conviction of the principal offenders.

ACCORD, in music, agreement in pitch and tone: thus when two voices or instruments are perfectly in unison of tone they are said to accord.

ACCORD, in law, a verbal agreement between two or more, to make reparation to any one of the parties who may be injured by a trespass.

ACCOUNT, or ACCOMPT, in general denotes all arithmetical computations. Among merchants it is used for the books in which their business is entered. See *Book-keeping*.

ACCOUNTS, *Chamber of*, in the old French government, was a court similar to our exchequer.

ACCOUNTANT GENERAL, in the court of chancery, an officer appointed to receive all money lodged in court and to place the same in the bank of England. Commissioners of public accounts are persons whose office it is to prepare statements of the receipts and expenditures of the public monies.

ACCRETION, in natural history, the increase of a body by the addition of new parts.

ACCROCHE, in heraldry, is when one thing is hooked in another.

ACCRUED, in heraldry, means a tree full grown.

ACCUBATION, the posture of the antient Greeks and Romans at their tables: the body was extended on a couch, and the head resting on a pillow, or on the elbow supported by a pillow.

ACCUMULATION *of Degrees*, in a university, is the taking two or more together, or with small intervals between them.

ACCUSATION, among civilians, is the bringing a criminal action against any person. In England, by Magna Charta, no man shall be condemned by accusation without trial by his peers; none shall be vexed by an accusation but according to the law. Promoters of accusations must find surety to pursue them; and if they do not make them good, shall pay damages to the accused and a fine to the king.

ACCUSATIVE, *in grammar, the fourth case, governed by an active verb or preposition*; as I love *him*, where *him* is the accusative of the pronoun *he*, and is governed by the verb *love*. In English grammar this is sometimes called also the objective case.

ACER, in botany, the maple or sycamore tree. It is of the class and order polygamia monoecia; and the characteristics are, calix, five cleft; corolla, five-petalled; stamina, eight or ten; germen, two or three superior; stylus, simple; capsule two or three, having one seed in each; but the male blossoms have no germen or stylus. There are twenty species of the maple tree. The great maple or sycamore tree is too common to need description. The wood is used by turners for bowls, &c. The acer campestre is also common and much used for hop-poles. The scarlet maple is remarkable for its fine scarlet flowers. The acer saccharinum, or American sugar maple, grows to the height of forty-feet. The sugar is obtained by boring the tree with an augur, when the sap is ascending, by which means from twenty three gallons of sap extracted from two trees in a day, near five pounds of sugar have been obtained.

ACERRA, among the antients a sort of altar placed near the bed of a dead person on which incense and other perfumes were burnt previous to the funeral. *Acerræ* were the pots in which the incense was burnt.

ACESCENT, any thing turning sour, or which is slightly acid: the same as acidulous or sub-acid.

ACETABULUM, in antiquity, a vessel wherein sauce was served at table. Also a Roman measure both for dry and wet things. In anatomy acetabulum is a cavity in the head of a bone to receive the head of another.

ACETIC ACID, that which has a larger proportion of oxygen than acetous acid, which see.

ACETITE *of Pot-ash*, a salt in the native sap and other vegetable juices, and likewise in the urine of quadrupeds. It is artificially prepared by adding [illegible] of potash to distilled vinegar till the [illegible] obtains a slight addition of acid. The salt is had in a solid state by evaporation.

ACETOUS ACID, a fluid obtained from distilled vinegar.

ACETUM ROSATUM, vinegar of roses. It is made of rose-buds infused in vinegar five or six weeks: the roses are then pressed out and the vinegar preserved. It is good for head-aches.

ACETUM *Prophylacticum*, a preparation of acetic acid, camphor, flowers of [illegible], &c. It is good against [illegible].

ACHANIA, in botany, a genus of the monadelphia polyandria class, and natural order of columniferæ. There are three species, all exotics, but cultivated here as hot house plants.

ACHERNER, a star of the first magnitude, in the southern extremity of the constellation Eridanus.

ACHERENT, an antient English corn measure, of about eight bushels.

ACHIAR, a pickle which comes from Batavia and is a mixture of various fruits *and roots* with vinegar and spices.

ACHILLEA, the milfoil, a genus of plants of the polygamia superflua [illegible] der and syngenesia class. It has twenty-seven species, but only two are natives of Britain. The achillea pharmica, or sneezewort is used as a sternutatory. The English millefolium is the yarrow, and esteemed good for hemorrhages, dysenteries, &c.

ACHILLES, among the antient philosophers, was a term used for the strongest argument in debate.

ACHILLIS *Tendo*, in anatomy, a tendinous cord inserted into the os calcis.

ACHIOTTE, or ACHIOTTI, the same as what the French called *rocon*, and the Dutch *alcane*. It is the flower or seed of a tree which grows in South America. The fruit is contained in a rind resembling the chesnut; and the tree instead of leaves shoots out filaments, between which grow red grains, which after being baked into cakes, are sent to Europe. It is used as a fine red dye.

ACHOR, a running ulcer on the face, which chiefly affects children.

ACHIAS, the wild pear-tree, a genus of plants of the order and class hexandria monogynia. The flower has five erect petals; and the fruit is an oval berry with ten cells. There are four species all natives of the West Indies.

ACHROMATIC, a term signifying the want of colour. Achromatic telescopes are those contrived to remedy the aberrations in colours.

ACHYRANTHES, a genus of plants of the class pentandria monogynia and of the order of miscellaneæ. There are eleven species all natives of the East Indies. The altissima is the only one cultivated in Europe. It is about three feet in height with oblong pointed leaves. It flowers in July, and the seeds ripen in September. The plants must be reared in a hot bed.

ACIA, in botany, a genus of the monadelphia dodecandria class, and of the natural order of pomaceæ. There is only one species known, which is a native of Guiana, and grows to the height of sixty feet. The fruit is wholesome.

ACICULÆ, the spikes or prickles of the hedgehog and other animals.

ACID, in chemistry, one of the general classes of salts. The word is applied to all substances which are sour to the taste; or which change vegetables from a blue colour to red. Acids unite with water in nearly every proportion. They also combine with all the alkalies, and most of the metallic oxides and earths with which they form the compounds named essential salts. The knowledge of the properties and uses of acids has laid the basis of the present state of chemistry. That acidity proceeds from a principle common to all the salts, was tenaciously held among chemists, till all the theories formed upon it were overthrown by the experiments of Lavoisier, who proved that various combustible substances when united with oxygen, form acids; that many acids contain oxygen, and that after losing this principle they lose their acid properties. Thus phosphorus, charcoal, and sulphur, when separately inflamed in oxygen gas, combine with its base; obtain an increase of weight; and are changed into phosphoric, carbonic, and sulphuric acids. This theory has been strengthened by other experiments in which the acids have been decomposed into oxygen and different combustible bases; from whence it appears that the acids are compound bodies, for the most part formed by the union of another substance with oxygen, which substance is called the base or radical. When this radical is not found in a separate state it is termed *unknown*. See *Chemistry*.

ACIDIFIABLE *Base* or *Radical*, any substance simple or compound that can unite, without decomposition, with oxygen so as to possess acid properties. Though almost all acids contain oxygen yet they differ in their radicals; so that the acidifiable base determines the kind of acid.

ACIDOTUM, in botany, a genus of the monoecia polyandria, class and order; one species only of which is known. It is a native of Jamaica.

ACIDULUM, a species of native compound salts in which the alkaline base is supersaturated with acid.

ACINACES, a scymetar used by the Persians.

ACINUS, a term applied to berries or grapes growing in clusters.

ACLIDES, a missile weapon among the Romans, said to be a kind of dart or javelin.

ACNIDA, *Virginian Hemp*, in botany is a genus of the dioceia class, and pentandria order. There is but one species, which is a native of Virginia and is of little or no use.

ACNUA, a land measure among the antient Romans, containing nearly a quarter of an acre.

ACOLUTHI, in church history, was a term applied to candidates for the ministry. It was also used for the body guards of the emperors of Constantinople.

ACOLYTHIA, in the Greek church, the rubric regulating the order of divine service.

ACONITON, a name applied to vessels which have no internal coating.

ACONITUM, in botany, *wolf's bane*, or *monk's hood*, a genus of plants of the class and order polyandria trigynia. There are nine species of this plant, which is so called from the shape of its flower resembling a hood or helmet. All the species are poisonous; and even the smell is said to produce swooning fits and dimness of sight. The plant, however, has been used in rheumatisms and intermittents.

ACONTIAS, a sort of meteor having a round or oblong head with a tail like a javelin.

ACONTIUM, among the antient Greeks was a kind of dart.

ACORN, a small piece of wood placed on the top of the spindle on the mast-heads of ships to keep the vane from flying off.

ACORUS, *Calamus aromaticus*, sweet flag, or sweet rush, a genus of plants of the monogynia order and hexandria class. There are two species: the acorus calamus, loves shallow standing waters, and is common in England. This root is carminative and stomachic, and used as an ingredient in bitters.

ACORUS, in natural history, a blue coral which grows in the form of a tree on the African coast.

ACOUSMATICI, a term applied to

those scholars of Pythagoras who had not completed their probation.

ACOUSTICS, the science of sounds. See *Pneumatics.*

ACOUSTIC *Duct*, in anatomy, is the external passage of the ear, or *meatus auditorius.*

ACOUSTIC *Instrument*, the ear-trumpet, for the purpose of assisting deaf persons. It is shaped like a horn, with a perforation at the small end to fit the ear.

ACQUITTAL, in law, a discharge or setting a person free from accusation of a crime.

ACQUITTANCE, a written discharge for a sum that has been paid.

ACRE, a measure of land, containing four square roods, a rood forty perches, or poles of sixteen feet and a half each. The arpent or old French acre was equal to one and a quarter of the English acre. The acre in Scotland is to that of the English as 100,000 to 78,694. England is said to contain above 30 millions of acres. *Acre Tax*, a tax levied upon lands, at so much per acre.

ACRIFOLIUM, a term applied generally to plants having prickly leaves.

ACROATIC, or ACROAMATIC, any thing sublime or profound. The term was applied to those disciples of Aristotle who were admitted to secrets in his philosophy.

ACROBATICA or ACROBATICUM, an engine used by the Greeks on which people were raised for the purpose of having a better prospect.

ACHROCHIRISMUS, a pugilistic exercise among the antient Greeks.

ACROCORDUS, the warted snake, a kind of snake covered with warts. There are but three species known: 1. The acrocordus Javanicus is white below, and the sides marked with dark spots. It measures about eight feet in length; and in the largest part of the body the thickness is ten inches; but at the tail only an inch and a half. It is a native of Java, whence its name. 2. The doubtful or brown acrocordus has a carinated abdomen and the sides spotted with black. It very much resembles the preceding, though inferior in size; there is a specimen in the British museum. 3. The fasciated acrocordus, has a carinated abdomen with whitish ascendant lateral bands; in all other respects it agrees with the other species.

ACROMION, or ACROMIUM, in anatomy, the upper part of the scapula or shoulder blade.

ACRONICAL, or ACHRONICAL, a term applied to the rising of a star, when the sun sets; but it is also used for a star's rising at sun-set, or setting at sun-rise.

ACROSPIRED, a term used by maltsters for those grains which shoot at both ends.

ACROSTIC, in poetry, a composition in which the initials of the verses make a name, a motto, &c.

ACROSTICUM, *Wall rue*, in botany, a genus of ferns; the character of which is that the fructification covers the whole under surface of the frond. Out of the forty-four species two only are *natives of this island.*

ACROSTOLIUM, among the antients was the ornament used on the prows of their ships. The forms were various.

ACROTERIA, in architecture, small pedestals on which ornaments stand at the ends or middle of pediments, or frontispieces. The height of those at the end should be half that of the tympanum, but those in the middle one eighth more. The term is also applied to ornaments on the tops of churches.

ACROTERIA, in anatomy, the tops of the fingers.

ACT, in logic, any operation of the mind, as comprehending, judging, &c. Among lawyers, *act* denotes an instrument or deed which proves the truth of a transaction. The word is also made use of for the decree of a public body, as acts of parliament, &c. In the English Universities *act* is a thesis maintained by a candidate for a degree. At Oxford the term when masters or doctors complete their degrees is called the *act*, but at Cambridge it is termed the *commencement.*

ACT *of Faith*, or *Auto da Fe*, in the church of Rome, is a jail delivery of the inquisition, when the prisoners confined by that horrid tribunal are set free, burnt at the stake, or sent to the gallies.

ACTA, among the Romans, a villa on the side of a river, appropriated to pleasure.

ACTÆA, or *Herb Christopher*, a plant of the polyandria monogynia class and order. Of the four known species, one grows wild in Britain, and is used in medicine as a repellent. The actæa racemosa or black snake root is a native of America, where it is used against the effects of animal poisons, especially that of the rattle-snake.

ACTS, the divisions or parts of a play, which in tragedies and comedies are always five; but in musical pieces and entertainments mostly three.

ACTS *of the Apostles*, a canonical book of the New Testament, containing the history of the Christian church from the ascension of Jesus Christ to A. D. 63. It was written by St. Luke, and addressed to Theophilus.

ACTIAN *Games*, among the Romans were diversions instituted to commemorate the battle of Actium. They were celebrated once in five years.

ACTINIA, in natural history, a genus of worms of the mollusca order. The body is rough and wrinkled, having eccentric cirri and a single terminal aperture. It is a marine animal, sometimes called sea-anemonies, and nettles. There are five species.

ACTION, in mechanics, and natural philosophy, the pressure or percussion of bodies against each other. Action and reaction are equal; *i. e.* the resistance of the body put in motion is equal to the force communicated to it.

ACTION, in rhetoric or oratory, is the accommodation of the voice, but particularly the gesture to the subject of the speaker. In poetry action is nearly the same with the subject of an epic or dramatic poem. In painting, and sculpture, *action* is the posture or attitude of a statue or picture. In the menage, *action of the* *mouth*, is when a horse champs on the bit of the bridle, and produces foam, which is regarded as a proof of his mettle.

ACTION, in law, is the process adopted to recover what is due previous to judgment. Actions are criminal or civil. Criminal actions are those which have judgment of death, as for murder, robbery, &c. or judgment for damages either to the party or the king. In this class may also be reckoned penal actions which lie for a penalty or punishment against the party sued. Actions on the statute are those which are brought for the breach of an act of parliament. Popular actions are such as are brought by way of information, and are called *qui tam* actions from the words of the writ. Civil actions are real, personal, or mixt. The first concerns only real property, concerning titles, lands, &c. Personal actions are those brought upon contracts for money or goods; or for trespass or other offence committed. Mixt action lies against a person both for real property and for damages for the wrong sustained. Actions of debt, trover, and trespass, must be brought in six years; of assault and battery within four years, and for slander within two years.

ACTION *upon the Case*, is a general action lying for the redress of wrongs done without force, and not specifically provided against by law.

ACTION. Among physicians actions are called vital, animal, or natural. The vital are those essential to life, as the motion of the heart and lungs. Animal actions comprehend those of the senses, and those of the will. The natural actions are those not absolutely necessary to life, as digestion, &c.

ACTION, in commerce, a term used in foreign countries for a share in the stock of a public company.

ACTIVE, a term in grammar applied to those verbs which express action, as *I read, I walk*, &c.

ACTOR, one who performs a part or character in a play. At Athens actors were so highly esteemed as sometimes to be sent on embassies; but at Rome, on the contrary, if a citizen became an actor he forfeited his freedom.

ACTUARIÆ *Naves*, among the Romans, were ships used in military expeditions.

ACTUARIUS, or ACTUARY, an officer or notary appointed to keep an account of the proceedings of a court. *Actuarii* were also persons who kept the military accounts, and distributed the corn to the Roman soldiers.

ACTUS, a Roman measure containing about one hundred and twenty feet.

ACULEATE, or ACULEATED, a term applied to any thing that has prickles; thus fishes are divided into those which have aculeated and not aculeated fins.

ACUMINA, among the superstitious of the antients, omens taken from the points of spears or swords.

ACUPUNCTURE, a surgical operation used in China and Japan, by puncturing the part affected with a gold or silver needle. This method is used for head aches, convulsions, epilepsies, dysenteries, and various other disorders.

ACUTE *Diseases*, in medicine, those which come suddenly to a crisis or termination.

ACUTE *Angle*, in geometry, that which is less than ninety degrees.

ACUTE, in music, a term applied to any sound that is sharp or high in respect to another sound.

ACUTATORES, among the antients, were smiths who attended the armies for the purpose of sharpening the weapons.

AD BESTIAS, a punishment among the Romans, by which the criminal was thrown to the wild beasts.

AD HOMINEM, in logic, an argument taken from the belief or principles of the opposed party.

AD LIBITUM, at pleasure, in music, denotes that the performer is at liberty at the place where it is written to introduce the effusions of his own fancy.

AD LUDOS, a Roman punishment, by which the criminals were obliged to fight with beasts or with each other.

AD METALLA, another punishment used by the same people, which sentenced criminals to the mines.

AD VALOREM, a term used for those duties or customs which are paid according to the value of the goods.

ADACTED, a military term for stakes or piles driven deep into the earth for securing ramparts or pontoons.

ADAGIO, in music, the second degree from slow to quick; and in general signifies a slow movement.

ADAMANT, a name given to the diamond, also to the scoria of gold, the magnet, &c.

ADAMI POMUM, in anatomy, a prominence in the fore part of the throat. It is the convex part of the first cartilage of the larynx.

ADAMIC EARTH, or *Terra Adamica*, the red clay supposed to be the earth out of which the first man was formed.

ADANSONIA, the Ethiopian sour gourd, a genus of plants of the monodelphia order and polyandria class, named after the French traveller Adanson. It is a native of Africa, where it grows to the height of 12 or 15 feet; but in circumference is often 60 or 70. The fruit is acid, and used in fevers.

ADAR, the twelfth month of the ecclesiastical and sixth of the civil year of the Jews: answering to part of February, and the beginning of March.

ADARCON, a scripture gold coin value about 15 shillings.

ADARME, a weight used in Spanish America; being nearly a dram.

ADCRESCENTES *Milites*, junior soldiers under the Roman emperors similar to cadets.

ADDER. See *Coluber*.

ADDICTI, among the Romans, were debtors who, not being able to pay their creditors, became their slaves.

ADDICTION, *Addictio*, in the Roman law, was the assignment of goods to another, which goods were called *Bona addicta*.

ADDITION, the first of the four fundamental rules of arithmetic.

ADDITION, in algebra, is the joining together all the letters or numbers to be bands of the extra-admiral run into each other.

ADMIRALTY, the office of lord high admiral, or of the commissioners appointed to discharge that office. The admiralty court has cognizance of all maritime affairs civil and criminal. All crimes committed on the high seas are cognizable only in this court which tries the same by judge and jury. But civil causes are determined according to the civil law.

ADMONITIO *Fustium*, a punishment among the Romans by whipping with vine-branches. It was confined to soldiers.

ADMONITION, in ecclesiastical law, is the warning given to an offender before excommunication.

ADNATA, one of the tunics or coats of the eye, also called conjunctiva and albuginea. It is commonly termed the white of the eye.

ADNATA, or ADNASCENTIA, in gardening, are terms applied to those off-sets which by a new germination in the earth, grow to the roots. *Adnata* is also made use of for those things which grow upon animal or vegetable bodies.

ADNOUN, the same as adjective.

ADONIA, ancient festivals celebrated in honour of Venus and her lover Adonis.

ADONIC, in antient poetry, a verse which consisted of a dactyle and a spondee or trochee. It was so called from being first used in the elegies on Adonis.

ADONIDES, a name given to those botanists who have compiled catalogues of plants in particular places.

ADONIS *Flos*, in botany, the pheasant's eye. It is of the class and order polyandria polygynia; and its character is, calyx five-leaved; petals five or more without a nectary; seeds naked. There are six species. The adonis autumnalis is annual, and grows common about London. Its flowers are scarlet with a black spot at the bottom. The adonis vernalis is a native of Switzerland and is cultivated in our gardens. It has a large yellow flower, and blows early in the spring.

ADOPTION, the act whereby one man makes another his heir. It was a common custom among the Greeks and Romans; as it still is with the Gentoos and Turks.

ADOPTIVE *Arms*, in heraldry, are those enjoyed by the grant of another.

ADORATION, the act of worship, from *ad* to, and *oris* the mouth, because the antient practice of adoration was by kissing the hand. In the Romish church the ceremony of paying homage to the pope by kissing his feet is termed adoration; and is always used by the cardinals when they have elected one of their brethren to the vacant chair.

ADOREA, a word of various acceptation among the Romans; it sometimes meant grain in general; at others a sort of cakes offered in sacrifice; and again it was used for the gratuitous distribution of corn, whence it was applied to all kinds of rewards.

ADOSSEE, in heraldry, two rampant animals situated back to back; also other figures which have their heads placed contrary to each other.

ADOXA, in botany, a genus of plants of the class and order of octandria tetragynia. It is commonly called bastard fumitory and grows wild in various parts of Britain.

ADRIFT, a marine phrase meaning that a vessel is broke loose from her moorings.

ADSCENDENS *Caulis*, in botany, is a stalk or branch inclining upwards.

ADSENTIRI, among the Romans, was the assent given by the soldiers to a proposition of their commanders.

ADSIDELLA, among the Romans, the table at which the flamens sat during the sacrifices.

ADSTRICTION, a medical term denoting the excessive rigidity of the emunctories of the body, particularly the closeness of the pores of the skin; also the styptic quality of medicines.

ADVANCE, money paid in part, before the delivery of the goods purchased.

ADVANCED *Ditch*, or *Moat*, in fortification, that made round the glacis or esplanade of a place.

ADVANCED *Guard* or *Vanguard*, the first line or division of an army, placed in order of battle. It also denotes a party of horse stationed before the mainguard.

ADVANCER, in sporting language, one of the branches of a buck's attire.

ADVENTITIOUS, among civilians, goods accidentally obtained. Adventitious fossils, are the same as extraneous ones, as shells, &c. in stone.

ADVENTURE, *Bill of*, among merchants, a writing stating that the goods on board a vessel are the property of another who is to run all risk, the merchant only binding himself to account for the produce.

ADVENTURER, one who hazards any thing. *Merchant Adventurers*, a company of traders formerly incorporated for the discovery of lands, &c.

ADVERB, in grammar, a part of speech joined to a verb, adjective or another adverb, to express the quality of it; as, he reads *well*, he prays *devoutly*.

ADVERSARIA, among the antients, a kind of common-place, or journal in which were inserted remarkable occurrences.

ADVERSATIVE, in grammar, a word denoting a difference between what precedes and that which follows it: as in this sentence, *he is generous* but *imprudent*, the word *but* is an adversative conjunction.

ADVERSATOR, among the antients, a servant who attended persons on their return from supper.

ADVERTISEMENT, notice of something announced in the newspapers. A penalty of £50 is inflicted on those who advertise or print a reward with "no questions to be asked", for the return of things stolen or lost.

ADVICE, *Letter of*, that by which a merchant informs his correspondent of his having drawn a bill of exchange on him, or that he has sent some goods to his order. In the former case the letter must mention all the particulars of the bill. *Advice boat*, a small vessel dispatched with particular expresses.

AD VITAM *aut culpam*, signifies that an office is to be held till the death of a delinquent. But this is more generally exresented by the phrase *guardia or bear gerit*.

ADULT, among civilians, means a person between the age of fourteen and twenty-five.

ADULTERATION, the act of debasing that which is good by improper mixtures. The *adulteration of coin* is making it inferior to the standard by too much alloy. This offence is capital. In pharmacy, *adulteration* is the using ingredients of less virtue in medical compositions. Among distillers, *adulteration* is the debasing of brandies or wines, by the mixture of improper liquors.

ADUMBRATION, in heraldry, the shadow of a thing outlined and painted of a darker colour than the field.

ADVOCATE, among the Romans, one who pleaded the causes of others. The term is still used in those countries where the civil law is retained. In Scotland there is a college of advocates consisting of one hundred and eighty members, who plead before the lords of session. The *lord advocate* is a state officer in that country who pleads the king's causes.

ADVOCATE *Fiscal, (fisci advocatus)*, an officer under the Roman emperors who pleaded causes belonging to the private treasury. *Advocates consistorial*, officers in the consistory at *Rome* who plead in cases of opposition to the disposal of benefices.

ADVOWSON, in ecclesiastical law, the right of patronage, or of presenting to a benefice.

ADYTUM, among the antients, the most sacred part of their temples, to which none but the priests had access.

ÆACEA, Grecian festivals celebrated at Ægina, in honour of Æacus one of the judges of the invisible world.

ÆDES, among the Romans, an inferior kind of temple, not consecrated by the augurs, the inner part of which was called *ædicula*.

ÆDILE, a Roman magistrate who had the superintendance of public buildings, and the care of the highways, bridges, weights and measures, &c. They had also the charge of the public morals, and the regulation of theatrical performances and diversions. At first there were but two, but afterwards two of the patrician order were added to them who were called *ædiles curules*. Cæsar created two more termed *ædiles cereales* who had the inspection of grain. The sentence of the ædile was called an *ædilian edict*.

ÆDITUUS, among the Romans, an officer who had the charge of the treasure and vessels of the temples. In the temples of the female deities the person who had this office was called *æditua*.

ÆGAGROPILA, or ÆGAGROPILUS, in natural history, a ball resembling hair, found in the stomach of the chamois goat. It is also called *bezoar germanicum*, but has no medicinal virtues.

ÆGICERAS, in botany, a genus of the class and order of the pentandria monogynia. Its characteristics are: calix, bell-shaped, half five-cleft; capsule, bow-shaped, one-celled, opening on the convex side; seed inverted. It grows in Ceylon and the Moluccas.

ÆGILOPS, an abscess in the corner of the eye, near the nose. It may be cured by moistening it frequently with spirit of vitriol; or by bringing it to a suppuration with a plaster of diachylon or emollient cataplasms.

ÆGILOPS, in botany, a grass of the polygamia and monœcia class and order. There are four species of this grass, which grow in the south of Europe.

ÆGIPHILA, a plant of the tetrandria monogynia class and order, and of the natural order of vitices. There are four species all shrubs, and natives of the West Indies.

ÆGIS, in the heathen mythology, the shield of Jupiter and Minerva.

ÆGOMANTIA, among the antients, a method of divination performed by means of a goat.

ÆGOPHTHALMUS, in natural history, the goat's eye stone, a general term for those gems in which the circular spots resemble the eye of a goat.

ÆGOPODIUM, or *Goat-weed, herb gerard*, a genus of plants of the pentandria digynia class and order, and of the natural order of umbelliferæ. There is but one species which is a native of Britain, and is common about hedges and gardens. It bears a small white flower.

ÆGOPRICON, a plant of the monœcia monandria class and order. There is only one species, which is a native of Surinam. It is a branching tree.

ÆGYPTIACUM, a detergent ointment used to eat off rotten flesh, and to cleanse foul ulcers.

ÆGYPTILLA, among the antients, was a stone diversified with [illegible] or red veins, and said to have the virtue of making water taste like wine.

ÆINAUTÆ, a term applied to the senators of Miletus, from holding their consultations on board a ship.

ÆNEATORES, in the Roman army, were the musicians who played on trumpets, horns, &c.

ÆNIGMA, a dark question or riddle, in which the real object is concealed under obscure language.

ÆOLIC *Dialect*, one of the dialects in the Greek language. *Æolic verse*, consists of an iambus or spondee and [illegible] two anapests separated by a long syllable.

ÆOLIPILE, a hollow ball of metal, with a slender neck, from which, when the vessel is partly filled with water and heated, issues a powerful blast [illegible] not taken to stop the aperture [illegible] while the vessel is on the fire, [illegible] will burst.

ÆOLUS'S HARP, a musical instrument, so called from Æolus [illegible] winds. Its construction is simple, [illegible] of catgut strings [illegible] over a wooden box. [illegible] placed where it may receive [illegible] current of air, produces a soft, pleasing [illegible]. It is supposed to have been invented [illegible] Kircher: but has since been much improved.

ÆON, the age or duration of a thing. The Platonists applied the word to every virtue or attribute; whence they denominated the Supreme Intelligence an assemblage of æons.

ÆRA, in chronology, a particular period from whence a series of years is reckoned; thus the christian æra, is the time of the birth of Christ, though some writers use the word æra for the number of years elapsed from a fixed point of time.

ÆRARIUM, the place where the public money was kept among the Romans. *Ærarium sanctum*, a place to contain the monies arising from the twentieth part of legacies reserved for the use of the state. *Ærarium Privatum*, the emperor's private purse. *Ærarium Ilithiæ*, the place where the monies were placed which parents paid at the birth of each child.

ÆRARIUS, a degraded Roman citizen, who, though liable to all taxes, forfeited every privilege of the state.

AERATION *of Soils*, is the impregnating them with air, by ploughing, harrowing, &c. so that the air may enter the pores of the earth.

AEROLOGY, the doctrine or science of air, giving an account of its nature, properties and phænomena. See *Air*.

AEROMETRY, the art of measuring the motion, density, elasticity, &c. of air. See *Pneumatics*.

AERONAUTICA, the art of sailing in the air. See *Air Balloon*.

AEROPHOBIA, the dread of air, a species of frenzy by which a person cannot endure a change of air.

AEROPHYLACEA, among some naturalists, are supposed caverns of air in the interior of the earth, to which is ascribed the origin of springs.

AEROSTATION. See *Air Balloon*.

ÆRUGINOUS, a term applied to things which resemble the rust of copper.

ÆRUGO *Salis*, a slimy matter, separated from the Egyptian natrum.

ÆRUSCATORES, strolling beggars, among the antients, who obtained money by fortune-telling. The term was also applied to the priests of Cybele, and the collectors of taxes.

ÆS, the brass coin of the Romans, consisting of the *æs rude*, *æs grave*, and *æs signatum*. The two first were paid by weight, but the last in number. *Æs flavum* among the Romans, was a term applied to inferior kinds of brass.

ÆSCHYNOMENE, or *Bastard Sensitive Plant*, a genus of the class and order diadelphia decandria. It is a shrub, and has eight species, all exotics; but two only are sensitive; the *æschynomene Americana*, and *sensitiva*. The others bear beautiful flowers. The *æschynomene Cannabina* is an East Indian plant, where it is used as hemp.

ÆSCULUS, *Horse Chesnut*, a genus of the heptandria monogynia class and order. There are three species: the common horse chesnut is of little use, though the blossoms are beautiful; deer and hogs, however, will eat the nuts. The yellow and scarlet horse chesnut are esteemed for their beautiful flowers.

ÆTHER, in philosophy, the most subtile of fluids, supposed by some to extend from our atmosphere toroughout the regions of the universe. But it is now much questioned whether there be such a fluid

ÆTHER, or ETHER, a volatile spirit obtained by distilling alcohol with an acid, and precipitating the acid gas with an alkali. There are two kinds, the *sulphuric æther*, made from equal parts of alcohol and sulphuric acid; and the *nitrous æther*, composed of twelve parts of alcohol, and eight parts of nitric acid. The æther is so volatile that it can hardly be poured from one vessel into another without a considerable evaporation. In the air æther boils at 98°, and in a vacuum at —20°. It is highly inflammable, and when kindled in a state of vapour burns rapidly with a white flame. When æther is applied to a gaseous body standing over mercury it doubles the bulk of the gas; and if oxygen gas thus expanded, be presented to a lighted candle, the æther burns fiercely, but without explosion. But if one part in bulk of the oxygen be mixed with three parts of pure oxygen gas, and kindled, a loud explosion follows. According to Fourcroy and Vauquelin, æther contains a greater portion of hydrogen and oxygen and less of carbon than alcohol.

ÆTHUSA, a genus of the pentandria digynia class and order, and belonging to the natural order of umbelliferæ. It is commonly called fool's parsley or lesser hemlock, and from its resemblance to common parsley has been sometimes used for it, and occasioned sickness.

ÆTIOLOGY, in rhetoric, a figure of speech by which the causes of an event are developed in the narration.

ÆTITÆ, or ÆTITES, pebbles or stones which have a loose nucleus within them, called the eagle-stone.

ÆTNA, a celebrated volcanic mountain in Sicily. It is said to be above 10,000 feet above the level of the sea, and in circumference at the base about 180 miles; but these dimensions are probably exaggerated. On the sides of the mountain are 77 cities and villages, The ascent is difficult and dangerous; and the traveller must pass through three different climates before he arrives at the summit.

AFFA, an ounce weight used on the Gold coast in Guinea.

AFFECTIO *Bovina*, a disorder peculiar to horned cattle, occasioned by a small worm which eats its way over the whole body

AFFETTUOSO, in music, intimates that the part to which it is applied must be played in a tender, moving way; rather slow than fast.

AFFIDAVIT, an oath in writing, taken before a person legally authorized.

AFFINITY, in the civil law, the degree of relation between parties. It is of three kinds; 1. Direct affinity, is that between the husband and his wife's kindred by blood. 2. Secondary affinity, between the husband and his wife's relations by marriage. 3. Collateral affinity, between the husband and the relations of his wife's kindred.

AFFINITY, among chemists, is the attractive power which combines substances of different natures with others. It is also named *elective attraction*, or *elective affinity*.

AFFIRMATION, the ratifying of the sentence of an inferior court by a superior. Also the solemn attestation of the truth of a fact made by quakers in a court instead of an oath, except in criminal cases.

K. In grammar, the same with

ATUS Among the antients, was which denoted the supposed inspi- t particular persons.

AY. In law, a public skirmishing n two or more persons. It is an punishable by fine and imprison-

ONTEE. In heraldry, those ani- hich face each other in an escut-

CAN *Company*. A society of mer- stablished in the reign of Charles ading to Africa; but the trade has g since laid open. The *African As-* for exploring the interior parts of as formed in 1788. The *African In-* for promoting the civilization and ement of Africa, was formed in 1807.

A marine term signifying the *abaft*.

RMATH. In husbandry, the grass grows after mowing; or the grass r corn. In some places it is called

A military commander among rks.

PÆ. Love-feasts, or meetings of mitive Christians for the purpose of ing mutual charity and benevo-

PANTHUS, the African tuberose , or blue lily, a genus of the hexan- nogynia class and order. It is a of the Cape of Good Hope, but is t in our green houses, and flowers ember.

PIS *Lapis*. A stone resembling the in, much valued by the antients.

RICUS. The mushroom, a genus of stogamia class and order of fungi. enumerates 390 species of this fun- which 38 are natives of Britain. The of the agaricus campestris or com- shroom is found in old hot beds dung, and when planted in a bed hot dung, soon produces a crop largely cultivated about London, ery profitable.

TE. In natural history, a semipel- em, diversified with veins and The Iceland agate resembles ass, with a dark or grey crust. likewise the name of an instru- ed by gold wire-drawers.

HOPHYLLUM. In botany, a the class and order dodecandria ia. It is a large tree which grows ga-car, where the nut and leaves as a spice.

E. The American aloe, a genus xandria monogynia class and or- ere are six species, of which the is the agave americana. It grows ight of 20 or 30 feet, and flowers g to the period of its growth, which ountry is slow, though according gar error the plant does not flower in a century. In Spain and Por- e great agave grows in hedges. es are said to serve instead of soap, fibres make a strong thread.

The same as generation, or a of 30 years: also certain periods of life, as infancy, youth, manhood, age. In chronology, *age denotes* *periods in the duration of the world,* as the patriarchal age which reaches to the time of Moses; then the age of the Jewish law, which extends to Christ; and lastly the age of grace, or that from the birth of Christ to the consummation of all things.

AGE. In law, signifies those periods of life in which persons may perform certain acts. At fourteen one may choose his guardian, and at twenty-one he is called of full age. By the marriage-act no persons can marry before they have attained that age, without the consent of parents or guardians.

AGEMA. A body of troops among the Macedonians, similar to the Roman legion.

AGEMOGLANS. A shocking practice formerly among the Turks, of taking one child out of three from the Christians every three years by way of tribute.

AGENTS. In physic and chemistry, signify all kinds of menstrua.

AGER. Among the Romans, a portion of land allotted to each citizen. In writers of the middle age, it denotes an acre of land.

AGERATUM. In botany, a genus of the class and order syngenesia polygamia æqualis. There are two species, natives of South America and China. They are annuals.

AGERATUS *Lapis*. A stone used by the antients in dressing leather.

AGGER. An old military term for a bank or rampart made of various materials.

AGGLUTINANTS. Strengthening medicines of a glutinous nature.

AGGLUTINATION. The giving a glutinous consistence to the animal fluids: also a term in astronomy for the coalition of stars in the same part of the zodiac.

AGGREGATÆ *Terræ*. The seventh order of earths; to which belong the granites, gneissum, porphyriae, amygdalites, breccia, and arenaria.

AGGREGATE. A botanical term for flowers composed of florets in such a manner that one cannot be removed without injuring the whole.

AGGREGATION. In philosophy, that union by which several things not naturally connected, are united together.

AGIO. A commercial term denoting the difference between the value of bank stock and the current coin.

AGISTMENT. In law, the taking the cattle of other people to graze by the week. *Agistment* signifies also a tax laid for repairing the sea-banks.

AGISTMENT *Tithe*. Is a small tithe paid to the parson for pasturage of cattle, horses or sheep.

AGMEN. A military term among the Romans, denoting the part of an army which was on its march.

AGNOMEN. An honorary name given to a person for some virtue, action, or accomplishment.

AGNUS DEI. In the church of Rome, a cake made of wax, impressed with a lamb bearing a cross, and consecrated by the pope.

AGONALIA. Festivals celebrated by the Romans in honour of Janus, or the God Agonius. They were kept three times a year.

AGONIUM. Among the Romans, was *the day on which the chief priest sacri-*

a victim; also the place where the public games were held.

AGONOTHETA. The superintendant of the sacred games among the Greeks.

AGORANOMUS. An officer at Athens who regulated the weights and measures, the prices of provisions, &c.

AGOSTUS. That part of the arm between the fingers and the elbow; likewise the palm of the hand.

AGRARIAN *Stations.* Among the Romans, were advanced guards placed in the fields. *Agrarian Laws,* were those which concerned the division and distribution of lands.

AGRICULTURE. See *Husbandry.*

AGRIMONIA. In botany, a genus of the dodecandria digynia class and order. There are five species, all natives of this island. The leaves of the common agrimony are good in jaundice, cachectic cases, and obstructions of the liver.

AGROSTEMMA, *Wild Lychnis,* or *Campion.* In botany, a genus of the pentagynia decandria class and order; and of the natural order of caryophillei. The principal species are, 1. Githago, hairy wild lychnis, or common campion. 2. Coronaria or single rose campion. 3. Flos Jovis, or umbelliferous mountain campion: the last is a native of Switzerland.

AGROSTIS, *Bent Grass.* A genus of triandrous plants, of the class and order triandria digynia. Gmelin enumerates 42 species, eight of which are natives of Britain.

AGROSTOGRAPHIA. The history or description of grasses

AGRYPNIA. Watchfulness; a symptom of fever. In the Greek church the term is applied to the vigil of any great festival.

AGUE. A general term for intermittent fevers. See *Medicine.*

AGYNEIA. In botany, a genus of plants comprehending two shrubs which are natives of China.

A-HULL. The situation of a vessel when her sails are furled, and she lies hull towards the wind and sea with the helm lashed to the lee side.

AID. In antient customs a subsidy paid by vassals to their lord on particular occasions.

AIGHENDALE. A liquid measure containing seven quarts, used in Lancashire.

AIGUILLE. In military affairs, an instrument made use of in mining a rock or for making roads.

AIGUISCE, or AIGUISSE. In heraldry, a cross with its four ends sharpened but terminating in obtuse angles.

AILANTHUS. A tree which grows in China and Amboyna, and called the tree of heaven from its great height. It flourishes in our climate. The wood is hard and resembles sattin. On perforating the bark a resinous juice exudes which becomes hard in a few days.

AIM-FRONTLET. An instrument formerly used by gunners to level and direct their pieces.

AIR. In a general sense, is the invisible fluid which surrounds this globe, to a considerable height. Formerly it was regarded as an elementary principle; but within the last fifty years the constituent properties of this fluid have been better known, and the experiments of late philosophers have reduced the knowledge of the air to a science. Dr. Black in his observations on the nature of heat, or elementary fire, discovered that on being admitted into solid bodies in a larger quantity than usual, it *expanded* them that the next *effect* was the reducing them to a state of *fluidity*; and that the last effect was to convert them into an *elastic* or aeriform fluid. Thus water, in its natural state is *ice*, but by a greater degree of heat it becomes fluid; and by an increase to above 212 degrees it becomes an *elastic* fluid. Hence it is inferred that heat or caloric is the only permanent natural fluid, and the cause of fluidity in other substances. It has been also found that some substances have a stronger attraction for caloric than others; which explains why certain things remain in a fluid state, and some even in a state of elastic fluidity, in the common state of the atmosphere.

But some of these aeriform fluids continue elastic only in a high temperature; as vapours from water, smoke, &c. whilst others retain the aerial form in every state of the atmosphere. This has produced a distinction between *elastic fluids*, and *permanently elastic fluids*, which last are called *gases*, from *gas* or spirit. Some of these are *simple*, i. e. when caloric is united with a simple elementary substance; others are *compound*, i. e. when two elementary substances are suspended in a mixed state by the caloric; such is our atmospheric air, made up of two elementary substances: 1. *oxygen*, in the proportion of about one-fourth, and 2. *azote* about three-fourths suspended in a mass of *caloric*. From hence it appears that the aeriform fluids differ from each other according to the elementary principles of their bases. But till within these last thirty years the doctrine of the aeriform fluids was scarcely known. The experiments of Black, Cavendish, and Priestly, however, at length contributed to establish a rational and permanent system. To the first of these philosophers we owe the discovery of the nature and properties of fixed or fixable air, which he obtained by dissolving calcareous earth in acids, whence he found that the caustic nature of lime is owing to its attracting from animal and vegetable matters a portion of the air of which it had been deprived, and on this principle he was able to render caustic the alkaline salts. Mr. Cavendish, in prosecuting these experiments, ascertained the quantity of fixed air retained by the fixed and volatile alkalies; he also accounted for the nature of acidulated waters by the fixed air contained in them; and he obtained inflammable air from solutions of iron and zinc in vitriolic acid. Dr. Priestly, in the course of his experiments in atmospheric air, discovered that the denser part of the air is precipitated by combustion, &c. and that the remainder becomes light. To him, also, is owing the discovery that vegetation purifies atmospheric air. He discovered likewise that the cause why air which has been respired is fatal, is its becoming impregnated with something stimulating to the lungs. But his greatest discovery is that the nitrous air procured from the solution of metals in the nitrous acid, destroys the purest part of common air. He found that the air obtained from calcined mercury is purer than common air, and he therefore called it *pure* or *vital air*, and this is what is now called *oxygen air* or *gas*. The next important discovery proper to be here mentioned is that of Mr. Cavendish, who, by inflaming a mixture of common and inflammable air by electricity, found that a proportion of the common air was consumed and pure water produced: and on mixing vital with inflammable air and passing through them the electrical spark, the whole became water.

The principal airs, or gases, according to modern philosophers, are:

Oxygen gas.
Azotic gas.
Hydrogen gas.
Ammoniacal gas.
Carbonic acid gas.
Carburetted hydrogen gas.
Sulphuretted hydrogen gas.
Phosphoretted hydrogen gas.
Nitrous gas.
Sulphureous acid gas.
Nitrous oxyd gas.
Muriatic acid gas.
Oxy-muriatic acid gas.
Fluoric acid gas.
Carbonous oxyd gas.
Olefiant gas.
Arsenicated hydrogen gas.

AIR, a term generally applied to vocal music, signifying a composition for a single voice.

AIR BALLOON, a bag filled with an aeriform fluid, by which means it ascends and floats in the air. Many attempts have been made by ingenious men in different ages to construct machines that should navigate the atmosphere; but it was not till 1782 that the experiment was carried into effect. In that year, two brothers of the name of Montgolfier of Annonay in France, formed the idea of filling a bag with smoke, which experiment having succeeded at Avignon, drew the attention of the Academy of Sciences, at whose expence a large balloon to which was suspended a cage containing a sheep, cock, and a duck, was sent up, and after rising to the height of 1,440 feet, fell at the distance of 10,200 feet from the place where it was launched without hurting any of the animals. The first person who ventured to make an aerial voyage was M. Pilatre de Rozier who ascended from the Fauxbourg of St. Antoine at Paris, Oct. 15, 1783. His balloon was supplied with smoke from straw burnt in a grate in the gallery where he sat. The first aerial voyage, with a balloon filled with inflammable air, was made by Messrs. Charles and Robart, Dec. 1, 1783. The apparatus for filling the balloon consisted of casks placed round a tub of water, each cask had a tin tube that terminated under a funnel inserted into the water in the tub; and a tube from this funnel communicated with the balloon. Iron-filings and diluted sulphuric acid were placed in the casks; and the gas being separated from these materials, was conveyed by the tubes through the water, and then to the funnel, from whence it passed into the *balloon*. These adventurers, after a delightful voyage, landed at Nesle, about 27 miles from Paris, having travelled at the rate of 15 miles an hour.

The first aerial voyage made in England, was by M. Lunardi from the Artillery-Ground, Sept. 15, 1784. But one of the most remarkable experiments in aerostation was that of M. Blanchard and Dr. Jefferies, who crossed from Dover castle to the forest of Guiennes in France, May 7, 1785. Our limits not allowing us to enumerate the various voyages which have been made in different countries, we must close this article with a brief notice of the two last made in England. June 30, 1802, M. Garnerin, a Frenchman, and another gentleman ascended with a balloon from Ranelagh, and in three quarters of an hour descended four miles from Colchester, a distance of above sixty miles. Sept. 21, 1802, M. Garnerin alone ascended from St. George's Parade, North Audley-street, and descended soon after in a field near the Small-pox Hospital at Pancras. To the balloon was suspended a parachute, in the manner of a large umbrella when shut, at the extremity of which was a circular basket wherein M. Garnerin sat. When the balloon was filled, the aeronaut placed himself in the basket, and ascended amidst the applause of innumerable spectators. In about eight minutes, the balloon being at an immense height, M. Garnerin cut the rope and instantly was disengaged from the balloon in his parachute, which fell rapidly, and on its expansion began to vibrate like the pendulum of a clock. Every beholder was alarmed for the safety of M. Garnerin who, however, landed safely, though he sustained some severe shocks in his descent.

AIR-GUN, a machine for discharging balls, &c. See *Pneumatics*.

AIR-JACKET, a garment made of leather, having several bags communicating with each other, which are filled with air by a leather tube furnished with a brass stop-cock, by which means a person may float without learning to swim.

AIR-PIPES, commonly called *Sutton's Air-Pipes*, from the inventor. They are formed on the principle that air is necessary for the support of fire; and were contrived to cleanse the holds of ships of foul air, which is done by closing the two holes under the copper or boiler, and in their room laying a copper or leaden pipe from the hold into the ash-place, by which means the foul air is discharged from the hold, which is replenished by a supply of fresh air from the hatches.

AIR-PUMP. See *Pneumatics*.

AIR-SHAFTS, in mining, are holes made from the surface to the adits, to furnish fresh air to the miners.

AIR-THREADS, in natural history, those filaments which float in the air in autumn. They are made by the long-legged field spiders.

AIR-TRUNK, an invention to prevent the stagnation of putrid effluvia in prisons and other crowded places. It consists of a long square trunk open at each end, one of which is inserted into the ceiling of the room, and the other extends beyond the roof. The putrid air, from its lightness, *ascends through* the trunk and being *carried off*, is replaced by fresh air.

AIR-VESSELS, those spiral ducts in the leaves, &c. of plants which supply them with air.

AITONIA, in botany, a genus of the class and order monadelphia octandria. The only known species is a shrub that grows at the Cape of Good Hope; but it is reared in England in green-houses. It was named after Mr. Aiton, the king's gardener at Kew.

AJUGA, *Bugle*, a genus of the gymnospermia order, and didynamia class, of plants, and of the natural order, verticillatæ or labiatæ. There are six species: 1. *Ajuga Genevensis*, a native of Switzerland and the southern parts of Europe. 2. *Ajuga orientalis*, a native of the east. 3. *Ajuga pyramidalis*, or mountain bugle, having a pyramidal spike and blue flowers, a native of England. 4. *Ajuga reptans*, the common or pasture bugle with creeping suckers, and blue, red, or white blossoms. It grows in our island. The roots are astringent. 5. *Ajuga Alpina*, Alpine, or mountain bugle, a native of the Alps and of the mountainous parts of Britain. 6. *Ajuga decumbens*, Japonese bugle.

AIZOON, in botany, a genus of the pentagynia order and icosandria class, and of the natural order succulentæ. There are ten species, natives of warm climates, but none of them remarkable.

ALA, in botany, the hollow turning between the stalk or branch of a plant and the leaf. It is also a term applied to the parts of leaves called lobes.

ALABASTER, a kind of stone which differs from marble in being combined with sulphuric acid. Specific gravity 1.87. Texture granular, with shining particles. The stone is in some degree transparent. It is produced in Germany, France, Italy, Greece and England. There are three species: 1. The snow-white shining alabaster, or lygdinum of the antients. 2. The variegated, yellow and reddish alabaster. 2. The yellowish or phengites of Pliny, which is found in Derbyshire.

ALÆ, an anatomical term applied to the cartilages of the nostril, the lobes of the liver, and to the armpits. In botany, *alæ* are the petals of the leaves of papillinaceous flowers, between the vexillum and carcinna; as in beans and peas.

ALARES, in Roman military antiquities, a kind of militia; but some think they were the cavalry, stationed as the two wings or *alæ* of the army.

ALAUDA, the lark, in ornithology, a genus of birds of the order of passeres, whose characters are these: the beak is cylindrical, subulated, straight, and the two mandibles of the same size; the tongue bifid, and the hinder claw straight and longer than the toe. There are thirty-three species, besides several varieties. The principal are, 1. The arvensis, or skylark: this and the woodlark are the only ones that sing when flying. 2. The pratensis, or titlark, which frequents meadows: it has a fine note. 3. The arborea, or woodlark, is distinguished by a white fillet about the head. It is less than the skylark, the colours are paler, and the voice less varied, but sweet. 4. The campestris has half of the chief feathers of the wings brown, except two which are white, and the throat and breast yellowish. 5. The trivialis, whose tail is partly brown and partly white; it is a native of Sweden. 6. The cristata, which is a native of Europe and sings like the skylark. 7. The spinoletta, which is a native of Italy. 8. The alpestris, a native of North America. 9. The magna, common in Africa and America. 10. The New Zealand lark which inhabits Charlotte Sound, where it is named *kogoo aroure*.

ALB, in the church of Rome, a white vestment, or surplice, worn by the priest.

ALBARIUM *Opus*, in antient architecture, the covering of the roofs with white plaster made of lime.

ALBATROSS. See *Diomedea*.

ALBE, a German coin valued at a French sol and seven deniers.

ALBERTUS, a German gold coin worth about 3s. 4d.

ALBINOS, the name given by the Portuguese to the white Moors whom the negroes despise as monsters. At a distance they appear like Europeans, but on approaching them their complexion resembles that of persons afflicted with the leprosy. A curious account of two albinos is in Saussure's journey in the Alps.

ALBUCA, in botany, a genus of plants of the hexandria monogynia class and order. There are eight species, all very tender, brought from the Cape of Good Hope.

ALBUGO, or LEUCOMA, a disorder arising from an opaque spot on the transparent part of the eye.

ALBULA, in natural history, are mineral waters of an aluminous quality.

ALBUM, in antiquity, a white table or register in which the names of magistrates, public transactions, &c. were entered.

ALBUMEN, a term applied by the chemists to that substance in eggs of fowls, commonly called the *white*. Albumen dissolves in water, and the solution gives a green colour to vegetable blues owing to the soda contained in it. When heated to the temperature of 134° it coagulates into a white solid mass, a property which distinguishes it from other bodies; but in this state it is no longer soluble in water. Heat, acids, and alcohol are the agents to coagulate albumen, the properties of which are different in its two states. Uncoagulated albumen is a glary liquid, with little taste and no smell. It becomes a transparent substance when dried, and is used as a varnish by bookbinders. If not dried it soon putrefies. Coagulated albumen is an opaque substance of a pearl white, tough, and of a sweetish taste. By drying it in the temperature of 212° it becomes of a brittle yellow colour, and transparent like horn. Albumen is very useful for clarifying fluids. From the effects of nitric acid on albumen it appears to consist of carbon, hydrogen, azote, and oxygen in unknown proportions. Albumen forms the membranous parts of several shells, sponges, &c. The white of a fresh egg applied in burns prevents them from rising in blisters; it also abates recent inflammation of the eyes, and preserves the face from freckles. A substance exactly the same as animal albumen is found in the roots of various vegetables; also in wheat, and the farinaceous seeds; likewise in green and succulent plants.

ALBURNUM, the white substance between the inner bark and wood of trees. It is preyed upon by insects, which lodge in its substance.

ALCA, or AUK, a genus of birds of the order of anseres. The beak is without teeth, short, convex, compressed, and often has transverse furrows. The inferior mandible is gibbous; and the feet have usually three toes. The species are twelve, of which the principal are: 1. The impennis, northern penguin or great auk, having a compressed bill and an oval spot on each side of the eyes. 2. The alca, little auk, or black and white diver, with a conical bill, a white streak on the belly and wings, and black feet. 3. The arctica, or puffin, with a compressed bill and four furrows; the orbit of the eyes and temples are white; The legs are small, and it cannot stand except erect. 4. The torda, or razor-bill, with four furrows on the bill, and a white line on each side from the bill to the eyes. 5. The pica or black-billed auk, the cheeks, chin, and throat are white; in other respects it agrees with the former species. 6. The cirrhata or tufted auk, resembling the puffin, but larger. 7. The psittacula or parroquet auk is about the size of the little auk. It is found in Kamtschatka, and on the western shores of America.

ALCAICS, a term for several kinds of poetry, from Alcæus the inventor. The first consists of a spondee or iambic, an iambic, a cæsura, and two dactyles. The second of two dactyles and two trochees: these two kinds are called dactylic alcaics, besides which there is one stiled simply the alcaic, consisting of an epitrite, two choriambuses, and a bacchius.

ALCAID or **ALCALDE**, among the Moors and Spaniards, a magistrate who has the regulation of the police.

ALCANNA, a cosmetic powder made from the leaves of the Egyptian privet. An oil extracted from the berries of alcanna is used in medicine.

ALCAVALA, a tax in Spain of six per cent. upon the sale of property.

ALCEA, the holly-hock, in botany, a genus of the order polyandria, and the monadelphia class, and of the natural order columniferæ. Gmelin enumerates five species, the alcea ficifolia, rosea, sinensis, acaulis, and Coromandeliana. The holly-hock is propagated by seeds, which should be sown in the middle of April in a bed of light earth.

ALCEDO, or *King-fisher*, a genus of birds of the order of picæ, having a long, straight, thick triangular bill. There are many species, most of which frequent rivers, and are very quick in catching fish which they devour bones and all. The wings of most of the alcedo tribe are short, yet they fly with strength. Blue is the principal colour. The most remarkable species are 1. *Alcedo galbula*, or green jacamar, is about the size of a lark. The bill is square and black, and sharp at the point; the plumage a bright green, glossed with copper and gold. This species is found in Guiana and Brazil and feeds on insects. 2. *Alcedo ispida*, or common kingfisher, is about the size of a swallow; *the bill long, and the shape inelegant. The top of the head and the coverts of the wings are of a dark green spotted with light blue: the* back and tail of a bright azure; the under side of the body orange, and a band of the same colour from the bill to the eyes. It feeds on fish. 3. *Alcedo paradisea*, or paradise jacamar, is of the same size as the preceding; the throat, front of the neck, and under wing coverts are white; the rest of the body a dull green, slightly shaded with black, violet and copper. It is a native of Surinam. 4. *Alcedo rudis*, or Egyptian kingfisher, is about the size of the Royston crow. The bill is black, the head, shoulders, and back, brown; the throat and belly dusky white; the upper tail-coverts quite white; the tail ash-coloured, the legs of a pale green, and the claws black. It is a native of Egypt, and feeds on frogs, insects and small fish. 5. *Alcedo Cayenensis*, is about the size of a starling; the back is of a blue colour; the under parts white; and the legs red. It is a native of Cayenne and Guiana. 6. *Alcedo torquata*, or cinereous kingfisher, is about the size of a magpie; its colours are a bluish ash, chesnut, white, black, and yellow. It is a native of the West Indies.

ALCHEMILLA, or *Ladies Mantle*, in botany, a genus of the monogynia order and tetrandria class of plants, and of the natural order of senticosæ. Character: cal. eight-cleft; cor. none; seed one. Of the species which are four, the chief are: 1. the vulgaris or common ladies mantle, with leaves like a fan, and blossoms of a yellowish green. 2. The alpina or cinquefoil ladies mantle. It is a native of the mountainous parts of Europe. 3. Alchemilla minor or least ladies mantle. It is a native of the northern regions.

ALCHEMY, an exploded branch of chemistry which had for its objects the transmutation of metals into gold, an universal panacea, &c. in the search for which however, many of the adepts made several valuable discoveries.

ALCHORNEA, in botany, a genus of the dioecia monodelphia class and order. Characters are male, calyx three, five-leaved; cor. none. Female, calyx one-leaved, five-toothed, cor. none, style two parted; caps berried, dicoccous.

ALCOHOL, in chemistry, a term used for any highly rectified spirits, but by modern chemists applied to the purely spirituous part of liquors that have gone through the vinous fermentation. Ardent spirits consist almost wholly of water, alcohol, or spirit of wine, and a small portion of oil from which they derive their flavour. In the distillation of such liquors in a water bath, a fluid comes over which is called rectified spirits, alcohol, and spirit of wine. The water that remains is separated from the spirit by carbonat of potash. Alcohol is a very transparent liquor and produces inebriation. It has never been frozen, even when the cold has been most intense. The specific gravity of alcohol when rectified to the highest is 0.825: that used in trade is rarely less than [illegible]. Alcohol boils at the temperature of [illegible], when it becomes an elastic fluid. It [illegible] at 0°. It is very combustible, and burns away with a blue flame without leaving any residuum. Lavoisier found that [illegible] grains of alcohol, consumed during [illegible] the combustion, consisted of

22.84	carbon
6.03	hydrogen
47.83	water
76.7	

That alcohol contains oxygen has been recently proved, for when equal parts of alcohol and sulphuric acid are mixed, the latter is not changed, but the alcohol is converted into water and æther, which it could not be unless it contained oxygen. Alcohol mixes with water in every proportion: and by the following table the proportion of real alcohol and water in mixtures may be ascertained. If the alcohol at 0.800 is pure, then alcohol of 0.813 is composed of 100 alcohol + 2 water.

0.818	100 + 4
0.825	100 + 7.53, or 93 + 7.

Alcohol readily dissolves the fixed alkalies and forms with them a red acrid solution, from which alone the alkalies can be obtained in a pure state. Alcohol dissolves many saline bodies, as sulphat of soda, sulphat of magnesia, nitrat of potash, nitrat of soda, muriat of ammonia, &c. &c. The known affinities of alcohol are æther, volatile oil, and alkaline sulphurets.

ALCOHOL, is the name of a fine powder of lead ore, used by the ladies in Barbary for tinging their hair and eye-lids.

ALCOR, in astronomy, a small star in the tail of ursa major.

ALCORAN. See *Koran.*

ALCYONIUM, a genus of zoophytes. The root is fixed and coriaceous, with a cellular epidermis, penetrated with stellated pores, and shooting out tentaculated oviparous hydræ. There are twenty-eight species.

ALDEBARAN, the *Bull's eye*, in astronomy, a fixed star of the first magnitude, forming the eye of the constellation Taurus.

ALDER. See *Betula.*

ALDERMAN, a magistrate, subordinate to the mayor of a corporation. In London there are twenty-six aldermen, each having the charge of one of the city wards: which office is for life. On a vacancy, a wardmote is held within three days, by which another is elected and returned, to the court of aldermen. All the aldermen are justices of the peace; and the lord mayor is chosen from their body. In the times of the Saxons, alderman was a title of nobility.

ALDROVANDA, in botany, a genus of plants of the pentandria class and pentagynia order, of which there is only one species. The calyx has five parts; petals five; and capsule five blunt angles, with ten seeds. It is a native of Italy and the Indies.

ALE, a fermented liquor, obtained from an infusion of malt, and differing from beer in having a less proportion of hops. It was the ordinary liquor of the aborigines of this island who called it *curmi*, or strong water. There are two kinds of ale brewed in England, the pale and the brown: the former is made from malt slightly dried, and is more viscid than the latter which is brewed from high-dried malt. If ale becomes flat, or tartish, it should be drawn off into a jug in which as many drams of powdered chalk are put as there are pints of liquor; this produces a new fermentation which gives the ale its former taste. Ale and beer were first taxed by the 12 Car. II.

ALE-GILL, is that in which the dried leaves of gill or ground ivy are infused.

ALE-CONNER, an officer whose duty it is to inspect the measures in public houses.

ALE-HOUSES must be licensed by justices of the peace who take recognizances of the persons licensed, and of their sureties, in 10*l.* each, that they will keep orderly houses. Every person, except those who sell ale in fairs, neglecting to take out a licence shall pay a fine of 40s. for the first offence, 4*l.* for the second, and 6*l.* for the third, with costs. Licences are granted on the first of September, or within twenty days after. *Ale-silver*, in London, is a yearly tax paid to the lord mayor by all persons selling ale within the city.

ALEA, among the Romans, was a term applied to games of chance in general; but particularly to one played with dice and tables.

ALECTORIA, a stone said to be formed in the gall-bladders of old cocks to which the antients ascribed many fabulous virtues. It is called the *alectorius lapis*, and in English the *cock-stone.*

A-LEE, in marine language, is when the wind crossing the line of a ship's course, presses her down on one side, which is called her lee-side: hence when the helm is moved to this side it is said to be *a-lee*, or *hard-a-lee.*

ALEGER, a sort of vinegar made of malt liquor.

ALEMBICK, a vessel formerly used in distillation; commonly made of copper or glass: instead of which retorts and the worm-still are now employed.

ALETRIS, in botany, a genus of plants of the monogynia order, and hexandria class; and ranking under the natural order coronariæ. There are nine species. 1. The farinosa, a native of North America. 2. The capensis, a native of the Cape of Good Hope. 3. The hyacinthoides, or Guinea aloe. 4. The Zeylanicia, or Ceylon aloe. 5. The fragrans, or true aloe, a native of Africa. 6. A. glauca, a native of the Cape. 7. A. uvaria, great orange-flowered aloe, a native also of the Cape. 8. A. pumila, small orange-flowered aloe. 9. A. Cochinchensis, a native of Cochin China. They are with us stove-plants.

ALEXANDRIAN *Manuscript*, a copy of the New Testament in the British Museum, which was sent to Charles I. by Cyrillus Lucar, patriarch of Constantinople, about 1630; and is supposed to have been written by Thecla an Egyptian lady in the 4th century. Dr. Woide has published a facsimile of it.

ALEXANDRINE, a kind of verse first used in a French poem entitled Alexander. It consists of twelve syllables.

ALEXIPHARMICS, an obsolete physical term, applied to medicines for expelling poison by sweating.

ALFECCA, in astronomy, is the same star called also Alfeta and Lucida coronæ.

ALGÆ, one of the seven families or tribes into which Linnæus has divided the vegetable kingdom. They denote those plants whose root, leaf, and stem are all one; and they comprehend all sea-weeds, and some other aquatic plants. In the sexual system they form the third order of the 24th class *cryptogamia*.

ALGEBRA, a method of calculating quantities in general by means of signs or characters. It has also been called *specious arithmetic*, on account of the *species* or letters made use of in it; and by Sir Isaac Newton *universal arithmetic*, from its performing all arithmetical questions by indeterminate quantities. The word *algebra* is from the Arabic, in which language *al-gjabr W'al-mokabala* means the art of resolution and equation. Diophantus was the first Greek writer on algebra. His work, however, only extends to the solution of arithmetical indeterminate problems. In 1494, Lucas de Burgo, published at Venice, a treatise on algebra, which goes no farther than quadratic equations. After him came Stiflios, Scipio Ferreus, Cardan, Tartaglia, and others. In our own country the first writer upon algebra was Dr. Record, a physician, who published in 1557 a book entitled *Cos Ingenii, or the Whetstone of Wit*, which is a treatise of algebra, the word *cos* alluding to *cossic numbers*, or the rule of *cos*, by which this art was sometimes called. In 1590, Vieta published a new method of algebra, which consists in denoting both known and unknown quantities by symbols or letters. He also invented the method of extracting the roots of equations by approximation. He was followed by our countrymen Oughtred and Harriot; the former applied the analytic method to geometry, and the latter left behind him his Treatise of the analytic art, in which he removed every thing superfluous in former methods, and introduced many important discoveries, of which Des Cartes availed himself in the application of algebra to the higher geometry. From that time continual improvements have been made in algebra by various mathematicians.

Definitions.

1. Known quantities are generally represented by the first letters of the alphabet, as, a, b, c, &c. Unknown by the last; as, x, y, z.

2. The sign + (*plus* or more) is the mark of addition. Thus, $a+b$ means that the quantities represented by a and b are to be added together. When no sign is prefixed, + is understood.

3. The sign − (*minus* or less) denotes subtraction; as $a-b$, that is, the number represented by b is to be subtracted from that represented by a.

4. Quantities with the sign + prefixed, are called positive or affirmative; and those with the sign − negative quantities.

5. The sign × (or *by*) denotes multiplication: as 5×4 means that 5 is to be multiplied by 4.

6. ÷ is the mark of division; thus, $a\div b$ means that a is divided by b.

7. A number prefixed to a letter is called a numeral coefficient. When no number is expressed, 1 is understood.

8. A simple quantity consists *of one part* or term, as a, $-b$, $-abc$; a *compound quantity* of more than one, connected by the signs + or −; as, $a+b$, $a-b+c$, are compound quantities. If there are two terms it is called a *binomial*, if three a *trinomial*, &c.

9. Like quantities consist of the same letters repeated; thus, $+4ab$, $-5ab$, are like quantities; but $+ab$, and $+aab$ are unlike.

Of ADDITION.

Case 1. To add quantities that are alike and have like signs.

Rule. Add the coefficients together, to their sum join the quantities and prefix the common sign.

Examples.

To	$2a$	to $-4y$	$21ab+4x$
Add	$4a$	add $-2y$	$ab+x$
Sum	$6a$	$-6y$	$22ab+5x$

Case 2. To add quantities that are like but have unlike signs.

Rule. Subtract the lesser coefficient from the greater, prefix the sign of the greater to the remainder, and subjoin the common letter or letters.

Examples.	To	$5a$	$14b-6c$
	Add	$-2a$	$-3b+8c$
	Sum	$3a$	$11b+2c$

Case 3. To add terms that are unlike.

Rule. Set them all down one after another with their signs and coefficients.

Ex.	To	$a+d$	$-15m+7a$
	Add	$2y$	$8y-2b$
		$a+d+2y$	$-15m+7a+8y-2b$

SUBTRACTION.

General Rule. Change all the signs of the quantities to be subtracted into their contrary signs, and add them to the others by the preceding rules; which will give the difference or remainder.

Ex.	From	$5a$	$7ab-6bc$
	Take	$3a$	$3ab+mb$
	Rem.	$5a-3a$ or $2a$	$4ab-6bc-mb$

The reason of this rule is that to subtract a negative quantity is the same as adding its positive value.

MULTIPLICATION.

General Rule for the Signs. If the signs of the two terms are like, that of the product is +, but if unlike, it is −.

Case 1. To multiply two terms.

Rule. Find the sign of the product by the general rule; then place after it the product of the numeral coefficients, and the letters one after another.

Ex.	Mult.	a	$+3b$
	by	b	$-c$
		ab	$-3bc$

Case 2. To multiply compound quantities.

Rule. Multiply each term of the multiplicand, by the terms of the multiplier and collect the products into one sum.

Examples.

$$\begin{array}{ll} \text{Mult} & 2a+3b \\ \text{By} & 3ax-4ay \\ \hline & 6aax+9abx \\ & -8aay-12aby \\ \hline & 6aax+9abx-8aay-12aby \end{array}$$

$$\begin{array}{rl}
\text{Mult.} & a-b \\
\text{By} & c-d \\
\hline
 & ac-cb \\
 & \quad -ad+db \\
\hline
\text{Product} & ac-cb-ad+db
\end{array}$$

When several quantities are multiplied together, any of them is termed a *factor* of the product.

The products arising from the continual multiplication of the same quantity are named its *powers*, and is the root. Thus aa, aaa, &c. are powers of the root a.

Powers are sometimes expressed by placing a figure above the root to express the numbers of the factors. As,

$$\left.\begin{array}{l} a \\ aa \\ aaa \\ aaaa \end{array}\right\} \begin{array}{l} \text{1st} \\ \text{2d} \\ \text{3d} \\ \text{4th} \end{array} \left\{\begin{array}{c} \text{power of the} \\ \text{root } a \text{ and} \\ \text{is thus} \\ \text{expressed.} \end{array}\right\} \begin{array}{l} a \\ a^2 \\ a^3 \\ a^4 \end{array}$$

The figures denoting the the number of the factors are called exponents, or indices.

Instead of multiplying compound quantities it is usual to set them down with a line over each of the compound factors; thus, $\overline{a+b}\times\overline{a-b}$ which means the product of $a+b$ multiplied by $a-b$. The line over the factors is called a *vinculum*.

Of DIVISION.

Rule for the Signs. If the signs of the divisor and dividend are the same, that of the quotient is +, if unlike, it is −.

The general rule in division, is to place the dividend above a line, and the divisor under it, expunging those letters which are in all the quantities of the dividend and divisor, and dividing the coefficients of all the terms by a common measure.

Thus in dividing $10ab+15ac$ by $20ad$, expunge a out of all the terms, and divide the coefficients by 5, which gives the quotient

$$\frac{2b+3c}{4d}$$

Powers of the same root are divided by subtracting their exponents. Thus if a^5 is divided by a^2 the quotient is a^{5-2} or a^3.

In dividing compound quantities the parts are to be ranged according to the powers of some one of its letters; thus if $a^2+2ab+b^2$ is the dividend, and $a+b$ the divisor, they are to be ranged according to the powers of a. Then divide the first term of the dividend by the first term of the divisor; multiply the quotient by the whole divisor and subtract the product from the dividend. If nothing remain, the operation is finished; but if there is a remainder it becomes a new dividend.

Thus a^2 divided by a, gives a which is the first quotient: and the product of this divided by the whole divisor $a+b$, viz. a^2+ab being subtracted from the dividend there remains $ab+b^2$. Divide the first term of this dividend by the first term of the divisor, and join the quotient with its proper sign; then multiply the whole divisor by this part of the quotient and subtract the product from the new dividend, and continue the same operation till there be no remainder.

Examples:

$$\begin{array}{r|l}
a+b) & a^2-b^2\ (a-b \\
 & a^2+ab \\
\hline
 & -ab-b^2 \\
 & -ab-b^2 \\
\hline
 & 0 \quad 0 \\
\hline
\end{array}$$

$$\begin{array}{r|l}
a-b) & aaa-bbb\ (\ aa+ab+bb \\
 & aaa-aab \\
\hline
 & aab-bbb \\
 & aab-abb \\
\hline
 & abb-bbb \\
 & abb-bbb \\
\hline
 & 0 \quad 0. \\
\hline
\end{array}$$

When the operation may be continued without end, the quotient is termed an *infinite series*.

Of FRACTIONS.

In a fraction the quantity above the line is termed the *numerator*, and that below the *denominator*.

If the numerator and denominator be multiplied or divided by the same quantity the value of the fraction is the same.

Thus: let $\frac{a}{b}=c$, then $\frac{ma}{mb}=c$; for by the last rule if the quotient $\frac{a}{b}=c$ be multiplied by the divisor b, the product must be a.

Hence a fraction may be reduced to a more simple one of the same value, by dividing the numerator and denominator by a common measure. Thus:

$$\frac{30ax-54ay}{12ab}=\frac{5x-9y}{2b}$$

A fraction is multiplied by an integer by multiplying the numerator, or dividing the denominator, by that integer.

When the numerator and denominator are equal, the fraction is equal to unity. If the numerator is greater than the denominator, the fraction is termed improper; but if the numerator is less, then the fraction is called proper, being less than unit. A mixed quantity consists of an integer and a fraction; thus, $3\frac{4}{5}$ and $a+\frac{a^2}{b}$

Problem 1. *To reduce a mixed quantity to an improper fraction.*

Rule. Multiply the integer by the denominator of the fraction; add the numerator to the product; and under the sum place the denominator. Thus,

$$2\frac{3}{5}=\frac{13}{5}; \quad a+\frac{a^2}{b}=\frac{ab+a^2}{b}$$

The converse of this problem is done by dividing the numerator by the denominator; the quotient gives the integral part; and the remainder placed over the denominator will be the fraction.

Problem 2. *To reduce Fractions of different denominations to fractions of equal value, having the same denominator.*

Rule. Multiply each numerator into all

except its own, and the
the *new numerators*,
l the denominators into
the product is the com-
r.

add and subtract Frac-

em to a common deno-
or subtract the numera-
the sum or difference
denominator.

multiply Fractions.

the numerators one into
e denominators which
mon numerator and de-

$\times \frac{c}{d} = \frac{ac}{bd}$

be multiplied is mixed,
l; and if an integer is
y a fraction, reduce it to
on by placing unit under

To divide Fractions.

the numerator of the di-
enominator of the divi-
uct will be the numera-
nt. Then multiply the
e dividend by the nu-
visor and the product is
Thus,

$$\frac{bc}{ad} = \frac{c}{d} \times \frac{b}{a}$$

Let $\frac{a}{b} = m$ and $\frac{c}{d} = n$;

$c = dn$; also $ad = bdm$,

refore $\frac{bdn}{bdm} = \frac{m}{n} = \frac{bc}{ad}$.

find the greatest common
of two numbers.

he greater by the less;
emainder, the less is the
: but if there be a re-
he last divisor by it; and
o remainder is left, and
ill be the common mea-
hus the greatest common
63 is 9, and the greatest
of 256 and 48 is 16.
measures of algebraic
id in a similar manner;
lers are to be divided
visors and the quantities
to the powers of the
s, to find the greatest
of a^2-b^2 and a^2-2ab+

$$a^2-2ab+b^2\;(1$$
$$a^2-b^2$$
$$\overline{-2ab+2b^2}$$

divided by $-2b$ reduced

$$a^2-b^2\;(a+b$$
$$a^2-b^2$$
$$\overline{0\quad 0}$$

Problem 7. *To reduce a fraction to its lowest terms.*

Rule. Divide the numerator and denominator by their greatest common measure. Thus,

$$\frac{75abc}{125bcx} = \frac{3a}{5x}$$

the greatest common measure being $25bc$.

When unit is the greatest common measure, the fraction is in its lowest terms; and numbers whose greatest common measure is unit, are said to be prime to each other.

Problem 8. *To reduce a given fraction to one equal to it having a given denominator.*

Rule. Multiply the numerator by the given denominator, dividing the product by the former denominator, and the quotient set over the given denominator is the fraction.

Of INVOLUTION.

This is only the raising of powers from any given root by multiplication; for the quantity given being multiplied by itself is the square of that quantity, the product multiplied by the given quantity will give its cube, and that multiplied again by the given quantity will be the fourth power thereof; and so on as in common arithmetic. Thus a^2, a^3, a^4, are the powers of a.

To find the powers of given quantities.

Case. When the quantity is simple.

Rule. Multiply the exponent of the letters by the index of the power required, and raise the coefficient to the same. Thus the second power of a is $a^{1+1} = a^2$. The third power of $2a^2$ is $8a^{2\times3} = 8a^6$. For the multiplication would be performed by the continual addition of the exponents, and this multiplication is the same. If the sign of the given quantity is +, its powers are all positive; but if —, the powers whose exponents are even members are positive; and those whose exponents are odd, are negative.

Case 2. When the quantity is compound.

Rule. The powers are found by a continual multiplication of the quantity by itself. Thus, the square of $x + \frac{a}{2}$, is $x^2 + ax + \frac{a^2}{4}$. The cube is obtained by multiplying the square by the root, &c.

The powers of any binomial $a+b$, are found by multiplying it continually by itself; *e. gr.*

$$\begin{array}{rl}
 & a+b = \text{the root.} \\
\times & a+b \\
\hline
 & a^2+ab \\
 & \quad +ab+b^2 \\
\hline
 & a^2+2ab+b^2 = \text{the square or 2d power} \\
\times & a+b \\
\hline
 & a^3+2a^2b+ab^2 \\
 & \quad +a^2b+2ab^2+b^3 \\
\hline
 & a^3+3a^2b+3ab^2+b^3 = \text{the cube or 3d}
\end{array}$$

power; and so on to any power.

If the powers of $a-b$ are required, they will be found the same as the above, only the terms will be negative: *e. g.* the cube of $a-b$ is $a^3-3a^2b+3ab^2-b^3$.

EVOLUTION,

Is the reverse of Involution, that is, it is the resolving of powers into their roots.

The root of any quantity is expressed by placing the radical sign or $\surd$ before it, with a figure denoting the denomination of the root.

Thus the square root of a $\sqrt[2]{a}$ or $\sqrt{a}$.

The cube root of bc is $\sqrt[3]{bc}$.

The 4th root of a^2b-x^3 is $\sqrt[4]{a^2b-x^3}$.

The root of a positive power may be either positive or negative, if denominated by an even number; but if an odd one, it is positive. If the power is negative, the root is the same, when denominated by an odd number. If the power be negative and the denomination of the root is even, no root can be assigned.

When the quantity whose root is required is negative, the radical sign should be set before it, and it is then called an imaginary root; *e gr.* The square root of $-a^2$ is marked thus $\sqrt{\overline{a^2}}$.

The root of a positive power denominated by an even number, has sometimes the sign $\pm$ before it, to express that it may be either + or —.

Case 1. When the quantity is simple.

Rule. Divide the exponents of the letters by the index of the required root, and prefix the root of the numeral coefficient.

1. The exponents of the letters may be multiples of the index of the root, and the root of the coefficient may be extracted, thus the square root of $a^4=a^{\frac{4}{2}}=\pm a^2$

$$\sqrt[3]{27a^6}=3\frac{6}{3}=3a^2$$

2. If the exponents of the letters are not multiples of the index of the root, they become fractions, and when the root of the coefficient cannot be extracted it may be expressed by a fractional exponent.

$$\text{Thus, } \sqrt{16a^3b}=4a^{\frac{3}{2}}b$$

$$\sqrt[3]{7ax^3}=7^{\frac{1}{3}}a^{\frac{1}{3}}x=\sqrt[3]{7}a^{\frac{1}{3}}x$$

Case 2. When the quantity is compound.

To extract the square root.

Rule. The quantity is to be ranged according to the powers of the letters as in division. Extract the square root from the first term; subtract its square from the given quantity, and divide the first term of the remainder by double the part found, and the quotient is the second term of the root. Add the second part to double the first; from the last remainder subtract the product, and if nothing is left the square root is obtained; but if there be a remainder, divide it by double the parts already found, and the quotient is a third part of the root; and so on.

Examples.

$$\begin{array}{rl} & a^2+2ab+b^2\ (a+b \\ & a^2 \\ \hline 2a+b\ ) & 2ab+b^2 \\ \times b\ (& 2ab+b^2 \\ \hline & 0\quad 0 \\ \hline \end{array}$$

$$\begin{array}{rl} & xx-ax+\frac{1}{4}aa\ (x-\frac{1}{2}a \\ & xx \\ \hline 2x-\frac{1}{2}a\ ) & -ax+\frac{1}{4}aa \\ \times -\frac{1}{2}a\ ) & -ax+\frac{1}{4}aa \\ \hline & 0\quad 0 \\ \hline \end{array}$$

To extract any other root.

Rule. Range the quantity acc the dimensions of its letters, an the root of the first term. Raise t unit below the number which nates the root required, and mu power raised by that number. D second term of the given quanti product, and the quotient will b cond number of the required roo the 5th root of

$$\begin{array}{l} a^5+5a^4b+10a^3b^2+10a^2b^3+5ab^4+ \\ a^5 \\ \hline 5a^4)5a^4b \\ \hline \end{array}$$

And $a+b$ raised to the fifth the given quantity, and therefore required.

In extracting roots it often hap the exact root cannot be found terms; thus the square root of a

$$a+\frac{x^2}{2a}-\frac{x^4}{8a^3}+\frac{x^6}{16a^5}-\frac{5x^8}{128a}+$$

The general rule for the inv binomials applies also to their ev

OF PROPORTION.

The first relation of quantities i by their arithmetical ratio; the their geometrical ratio. The ter ratio is the subject of enquiry is antecedent; and that which is c is called the consequent.

In four quantities when the d between the first and second is that between the third and four quantities are called arithmetica tionals; as 3, 7, 12, 16, & a, $a+$

Quantities form a series in ari proportion when they increase or by the same constant difference 3, 4; 10, 7, 4, 1; and a, $a+b$, $a+$

In four quantities arithmetical tional, the sum of the extreme to the sum of the mean terms; arithmetical proportionals a, $a+$ the sum of the extremes $a+e+$ sum of the mean terms $a+b+e$; to find the fourth arithmetical pr al add the second and third quan from the sum subtract the first te will give the proportional sought

When of four quantities the q the first and second is equal to t third and fourth, these quantiti proporion; as in the and the quantities are thus expressed:

$\frac{1}{2} : 1r$

$b : br$

4 to 12, &c.

al proportionals, the mes is equal to that e. g. $a+br=ar+b$.

proportional to three ltiply the second by the product by the the proportional re- the fourth propor- b; multiply ar by b, luct arb by a, and the rth proportional.

quantities increase by sior, or decrease by a ey are said to be in ion continued: as a, $a\frac{a}{r^2}$, &c.

iplier or divisor, is ratio.

nes the product of the ual to the product of out one, or to the pro- s equally remote from

es of geometrical pro- he first term, is equal at the last term multi- on ratio.

ATIONS.

s a proposition stating quantities by placing them.

taining only one un- its powers are divid- ing to the highest pow- quantity to be found

t,	the	simple,
l,	equa-	quadrat,
l,	tion is	cubic,
c.	called	&c.

s of the unknown quan- to be integers, and the eared of fractions in n quantity or any of the denominators, e. g.

simple equation; $3x$—

ired of the fraction by

sides by $2x$ is $6x$ — x — x x^6 — 0 which he sixth order, i. e. ation is to find the va- i term, in those which

s and their resolutions.

ntity may be transposed n equation to the other n.

$10 = x+5$

$x = 10+5$, or $x = 15$.

$= a+bx$

$x = a-b$

tities are here added to n both sides.

signs of the terms of an equation may be changed to and the equation still be true.

Rule 2. Any quantity by w known quantity is multiplied away by dividing all the othe of the equation by it; e. g.

$$\text{If } ax=b$$

$$x=\frac{b}{a}$$

$$\text{Also if } mx+nb=am$$

$$x+\frac{nb}{m}=a$$

For if equal quantities are di same quantity the quotients w

Rule fractio d, away by multiply a

e. gr. $$\text{If } \frac{x}{a}=b+c$$

$$x=ab+ac$$

$$\text{And if } a-\frac{b}{x}=c$$

$ax-b=cx$ and by transposing

$ax-cx=b$, and by division $x=\frac{b}{a-c}$.

For by multiplying all the terms of the equation by the same quantity, the quantities on each side are equal.

Coroll. If any quantity, on both sides of the equation have the same sign, it may be taken from both. And if all the terms in an equation are multiplied or divided by the same quantity, it may be taken away from all of them. e. g.

If $2x+c=a+c$, then $2x=a$.

If $2ax+3ab=ma+a$, then $2x+3b=m+1$.

$$\text{If } \frac{x}{3}-\frac{4}{3}=\frac{16}{3}, \text{ then } x-4=16.$$

Hereby the unknown term may be separated from the known, and the equation is resolved.

Examples of simple equations solved by these rules.

$$\text{If } 3x+5=x+9$$

$$2x=4$$

$$x=\frac{4}{2}=2.$$

$$\text{If } 5x-\frac{5x}{2}+12=\frac{4x}{3}+26$$

$$5x-\frac{5x}{2}-\frac{4x}{3}=26-12=14$$

$$30x-15x-8x=84$$

$$\text{or } 7x=84$$

$$x=\frac{84}{7}=12$$

$$\text{If } \frac{5}{x}+\frac{9}{4}=16$$

$$\frac{20}{x}+9=64$$

$$20+9x=64x$$

$$20=64x-9x=55x$$

$$x=\frac{20}{55}=\frac{4}{11}$$

Solution of questions producing simple equations.

General rule. Express the unknown quantities by letters, and the relations between the known and unknown, or as they are called the conditions, by equations, which being resolved, give the answer.

Example. If the question is concerning two numbers, they may be called x and y, and the conditions from which they are to be investigated must be expressed by equations: thus

If it be required that the sum of two numbers sought be 60, that condition is thus expressed } $x+y=60$

If their difference must be 24 then } $x-y=24$

If their product is to be 96 then $xy=96$

If their quotient is to be 6, then $\frac{x}{y}=6.$

Case 1. When only one unknown quantity is to be found.

Rule. An equation involving the unknown quantity must be deduced from the question; and when there is but one unknown quantity there can be but one independent equation in the question.

Ex. 1. To find a number to which if there be added a half, a third, and a fourth of itself the sum will be 50.

Represent the unknown quantity by z, then half of it is $\frac{z}{2}$, a third $\frac{z}{3}$, &c. Therefore, $z+\frac{z}{2}+\frac{z}{3}+\frac{z}{4}=50.$

$$24z+12z+8z+6z=1200$$
$$50z=1200$$
$$z=24$$

Case 2. When there are two unknown quantities.

Rule. Two independent equations involving the two unknown quantities must be derived from the question. A value of one of the quantities must be derived from each of the equations; and the two values being put equal to each other, a new equation will be formed, involving only one unknown quantity.

Ex. 2. A. says to B. seven years ago I was three times as old as you were, and seven years hence I shall be twice as old as you will be. What are their present ages?

Let the ages of A. and B. be x and y, then seven years ago their ages were $x-7$ and $y-7$, and seven years hence they will be $x+7$ $y+7$: therefore

$$x-7=3\times\overline{y-7}=3y-21$$
$$x+7=2\times\overline{y+7}=2y+14$$
$$x=3y-14$$
$$x=2y+7$$
$$3y-14=2y+7$$

$y=21$, the age of B.

$x=49$, the age of A.

Case 3. When there are three or more unknown quantities.

Rule. In this case there must be three independent equations arising from the question, from each of which a value of one of the unknown quantities must be obtained: then by comparing these three values, two equations will arise inv only two unknown quantities. In like ner the rule may be extended to fo more unknown quantities.

Ex. 3. To find three numbers the first with half the other two, th cond with one third of the other tw the third with one-fourth of the oth may each be equal to 34.

Let the numbers be x, y, z, an equations are

$$x+\frac{y+x}{2}=34$$
$$y+\frac{x+z}{3}+34$$

$z+\frac{x+y}{4}=34$ then by the first eq

$x=68\frac{-y-z}{2}$; and by the second

$x=102-3y-z$; and by the third

$x=136-\frac{1}{4}z-y$; therefore

$$\frac{68-y-z}{2}=102-3y-z$$

$y=\frac{136-z}{5}$; & by the two latter eq

$y=\frac{3z-34}{2}$, therefore

$$\frac{3z-34}{2}=\frac{136-z}{5}$$
$$15z-170=272-2z$$
$$17z=442 \text{ or } z=26$$
$$y=22, \text{ and } x=10$$

General Solution of Problem

In the solutions of the precedin tions, the given quantities, being n disappear in the last conclusion, so general rules for like cases can be from them. But if letters are use note both the known and unknow tities, a general solution may be o because during the whole operati retain their original form; whence nection of the quantities will pla cover the limits of the data whic cessary to the perfect solution o blem.

Ex. 4. To find two numbers the sum and difference are given.

Let s be the sum given, and d ference; and let x and y be the n sought. Then

$$x+y=s$$
$$x-y=d$$

Whence $\begin{cases} x=s-y \\ x=d+y \end{cases}$

$$d+y=s-y$$
$$2y=s-d$$
$$y=\frac{s-d}{2}$$

And $x=\frac{s+d}{2}$

Thus let the given sum be 100 difference 24.

Then $x=\frac{s+d}{2}=\frac{124}{2}=62$

$y=\frac{s-d}{2}=\frac{76}{2}=38.$

Of Pure Equations.

re equation is that in which only wer of the unknown quantity is

Make the power of the unknown y stand alone, then extract the root same denomination out of both nd this will give the value of the n quantity.

ple: If $a^2+ax^2=b^3$

$ax^2=b^3-a^2$

$x^2=\frac{b^3-a^2}{a}$

$x=\sqrt{\frac{b^3-a^2}{a}}$

adfected quadratic Equations.

dfected equation is that in which t powers of the unknown quantity ed in the several terms. An aduadratic equation (commonly calldratic) involves both the unknown y and its square.

1. Transpose the terms involving nown quantity to one side, and the terms to the other; so that the term ing the square may be positive. e square of the unknown quantity iplied by any coefficient, divide all ns of the equation by it, so that the nt of the square of the unknown y may be 1.

dd to both sides the square of half fficient of the unknown quantity, side of the equation involving the n quantity will be a complete

tract the square root from both the equation, and by transposing -coefficient just mentioned, a value nknown quantity will be had in terms. The different forms of quaequations expressed in general eing reduced by the first and serts of the rule are these:

1 $x^2+ax=b^2$

2 $x^2-ax=b^2$

3 $x^2-ax=-b^2$

I. $x^2+ax=b^2$

$x^2+ax+\frac{a^2}{4}=b^2+\frac{a^2}{4}$

$x+\frac{a}{2}=\pm\sqrt{b^2+\frac{a^2}{4}}$

$x=\pm\sqrt{b^2+\frac{a^2}{4}}-\frac{a}{2}.$

II. $x^2-ax=b^2$

$x^2-ax+\frac{a^2}{4}=b^2+\frac{a^2}{4}$

$x-\frac{a}{2}=\pm\sqrt{b^2+\frac{a^2}{4}}$

$x=\frac{a}{2}\pm\sqrt{b^2+\frac{a^2}{4}}.$

III. $x^2-ax=-b^2$

$x^2-ax+\frac{a^2}{4}=\frac{a^2}{4}-b^2$

$x-\frac{a}{2}=\pm\sqrt{\frac{a^2}{4}-b^2}$

$x=\frac{a}{2}\pm\sqrt{\frac{a}{2}-b^2}$

1. Every quadratic equation will have two roots except those of the third form whose roots become impossible. 2. In the two first forms one of the roots must be positive, and the other negative. 3. In the third form if $\frac{a^2}{4}$ or the square of half of the coefficient of the unknown quantity be greater than b^2 the known quantity, the two roots will be positive. If $\frac{a^2}{4}$ be equal to b^2 the two roots become equal; but if $\frac{a^2}{4}$ is less than b^2, the quantity under the radical sign will be negative, and the two roots are impossible. 4. If the equation express the relation of magnitudes abstractedly, where a contrariety cannot be supposed to take place, there are no negative roots.

Solution of Questions producing Quadratic Equations.

The operation till we arrive at a quadratic equation, is the same as in the solution of simple equations.

Examples. One lays out a certain sum in goods which he sells again for 24*l.* and gains as much per cent. as the goods cost him. What was the cost?

If the money laid out be . . .	1	y
The gain will be	2	$24-y$
But this gain is $y : 24-y :: 100$	3	$\frac{2400-100y}{y}$ pr. cent
Therefore by question	4	$y=\frac{2400-100y}{y}$
And by mult. & trans.	5	$y^2+100y=2400$
Completing the sqr.	6	$y^2+100y+2500=2400+2500=4900$
Extract the root	7	$y+50=\pm\sqrt{4900}=\pm 70$
Transpose	8	$y=\pm 70-50=20$ or -120.

The answer is 20*l.* the other root -120 being negative is impossible.

Of Indeterminate Problems.

If there are more unknown quantities in a question than equations, by which their relations are expressed, it is indetermined.

Example. To divide a given square number into two parts, each of which shall be a square number.

Here are two quantities sought and only one equation expressing their relation; but it is also required that they may be rational, which cannot be expressed by an equation; therefore another condition must be assumed so as to obtain a solution in rational numbers.

Let the given square be a^2; let one of the squares sought be x^2, the other is a^2-

U

x^2. Let $rx-a$ be a, also a, a side of the last square; therefore,

$$r^2x^2-2rxa+a^2=a^2-x^2$$

By transp. $\quad r^2x^2+x^2=2rxa$

Divide by x $\quad r^2x+x=2ra$

Therefore . . . $x=\frac{2ra}{r^2+1}$

And $rx-a=\frac{2r^2a}{r^2+1}-a=\frac{r^2-1}{r^2+1}a$

Let r be assumed at pleasure and $\frac{2ra}{r^2+1}$, $\frac{r^2-1}{r^2+1}a$, will be the sides of the two squares required.

Thus, if $a^2=100$: then if $r=3$ the sides of the two squares are 6 and 8, for $36+64=100$.

Also let $a^2=64$. Then if $r=2$ the sides of the squares are $\frac{32}{5}$ and $\frac{24}{5}$; and $\frac{1024}{25}+\frac{576}{25}=\frac{1600}{25}=64$.

The reason of the assumption of $rx-a$ as a side of the square a^2-x^2 is, that being squared and put equal to this last, the equation will be simple, and the root of such an equation is always rational.

Of the origin and composition of Equations, and of the Signs and Coefficients of their Terms.

The higher orders of equations and their general affections, are best investigated by considering their origin from the combination of inferior equations. Now all the terms of any equation are brought to one side, and the equation is expressed by making them equal to 0. Therefore if a root of the equation be inserted instead of the unknown quantity, the positive terms will be equal to the negative, and the whole equal to 0.

Def. When an equation is put into this form, the term in which the unknown quantity (x) is of the highest power, is made the first, that in which the index of x is less by 1, the second, and so on till the last into which the unknown quantity does not enter, and which is called the absolute term.

Prop. I. If any number of equations be multiplied together, an equation will be produced of which the dimension is equal to the sum of the dimensions of the equations multiplied. If any number of simple equations be multiplied together, as $x-a=0$, $x-b=0$, $x-c=0$, &c. the product will be an equation of a dimension containing as many units as there are simple equations. So if higher equations are multiplied together one of a higher order will be produced. *Conversely.* An equation of any dimension is considered as compounded of simple equations or of others the sum of whose dimensions is equal to that of the given one. By the resolution of equations these inferior equations are discovered, and by investigating the component simple equations, the roots of the higher orders are found.

Cor. 1. An equation admits of as many solutions, or has as many roots, as there are simple equations in it.

Cor. 2. Conversely, no equation can have more roots than dimensions.

Cor. 3. Imaginary or impossible roots must enter an equation by pairs, because they arise from quadratics. And an equation of an even dimension may have all its roots, or an even number of them impossible; but an equation of an odd dimension, must have one positive root at least.

Cor. 4. The roots are positive or negative according to the roots of the simple equations.

Cor. 5. When one root of an equation is discovered one of the simple equations is found; and the given equation being divided by it, will give an equation of a dimension lower by 1.

Prop. II. To explain the general properties of the signs and coefficients of the terms of an equation.

Let $x-a=0$, $x-b=0$, $x-c=0$, the roots are any positive quantities $+a$, $+b$, $+c$, $+d$, &c. And let $x+m=0$, $x+n=0$, &c. be simple equations, whose roots are any negative quantities $-m$, $-n$, and let any number of these equations be multiplied together as in the following table:

$$
\begin{array}{rl}
 & x-a=0\\
\times & x-b=0\\
= & \left.\begin{array}{l} x^2-ax\\ \quad -bx+ab\end{array}\right\}=0 \text{ a quadratic}\\
\times & x-c=0\\
= & x^3\left.\begin{array}{r}-a\\-b\\-c\end{array}\right\}\times x^2\left.\begin{array}{r}+ab\\+ac\\+bc\end{array}\right\}\times x-abc=0 \text{ a cubic.}\\
\times & x-m=0\\
= & x^4\left.\begin{array}{r}-a\\-b\\-c\\+m\end{array}\right\}\times x^3\left.\begin{array}{r}+ab\\+ac\\+bc\\-am\\-bm\\-cm\end{array}\right\}\times x^2\left.\begin{array}{r}-abc\\+abm\\+acm\\+bcm\end{array}\right\}\times x-abcm=0, \text{ a biquadratic, \&c.}
\end{array}
$$

From this it appears: 1. That in a complete equation the terms are always greater by an unit than the dimension of the equation.

2. The coefficient of the first term is 1. The coefficient of the second term is the sum of the roots with their signs changed. The coefficient of the third term is the sum of all the products made by multiplying any two of the roots together. The coefficient of the fourth term is the sum of all the products that can be made by multiplying together any three of the roots with their signs changed.

The last term is the product of all the roots, with their signs changed.

3. From induction it appears that in any equation there are as many positive roots as there are changes in the signs of the terms, and the remaining roots are negative.

Cor. If a term of an equation be wanting, the positive parts of its coefficient are equal. If there is no absolute term some of the roots $=0$, and the equation may be depressed by dividing all the terms by the lowest power of the unknown quantity in any of them.

Of the Transformation of Equations.

Prop. I. The affirmative roots of an equation become negative, and the contrary by changing the signs of the alternate terms, beginning with the second.

Thus the roots of the equation $x^4-x^3-19x^2-49x-30=0$, are $+1,+2,+3,-5$, but the roots of the equation $x^4+x^3-19x^2-49x-30=0$, are $-1,-2,-3,+5$.

Prop. II. An equation may be transformed into another having its roots greater or less than the roots of the given equation by a given difference.

Let e be the given difference, then $y=x\pm e$, and $x=y\mp e$; and if for x and its powers in the given equation $y\mp e$ and its powers be inserted, a new equation arises whose unknown quantity is y, and its value $x\pm e$.

Let the equation proposed be $x^3-px^2+qx-r=0$, of which the roots are to be lessened by e. By inserting for x and its powers $y+e$ and its powers the required equation is

$$\left.\begin{array}{r} y^3+3ey^2+3e^2y+e^3 \\ -py^2-2pey-pe^2 \\ +qy+qe \\ -r \end{array}\right\} = 0.$$

Cor. 1. The use of this transformation is to take away the second or any other intermediate term; for as the coefficients of all the terms of the transformed equation except the first, involve the powers of e, and known quantities only, by putting the coefficient of any term equal to 0, and resolving that equation, a value of e may be determined, which will cause that term to disappear.

Cor. 2. The second term may be taken away by the solution of a simple equation the third by a quadratic, and so on.

Prop III. An equation may be transformed into another, whose roots shall be equal to the roots of the given equation multiplied or divided by a given quantity.

Ex. Let $y=xe$, or $y=\frac{x}{e}$

Then substitute for x and its powers $\frac{y}{e}$ or ye and its powers, and the new equation will have the property required.

Cor. 1. An equation in which the coefficient of the first term is any unknown quantity, as a, may thus be transformed into another, in which the coefficient of the first term will disappear. Thus let the equation be $ax^3-px^2+qx-r=0$.

Suppose $y=ax$, or $x=\frac{y}{a}$ and for x and its powers insert $\frac{y}{a}$ and its powers, and the equation becomes $\frac{y^3}{a^2}-\frac{py^2}{a^2}+\frac{qy}{a}-r=0$, or $y^3-py^2+qay-a^2r=0$.

Cor. 2. Fractions may be taken away from an equation by multiplying the equation by the denominators, *and by this proposition the equation may be then transformed* into another without fractions, in which the coefficient of the first term is 1.

Cor. 3. And hence if the coefficient of the second term of a cubic equation be not divisible by 3, the fractions thence arising, wanting the second term, may be taken away by the preceding corollary. But the second term may be also taken away, so that there shall be no such fractions in the transformed equation by supposing $x=\frac{z\mp p}{3}$, $\pm p$ being the coefficient of the second term. And if the equation $ax^3-px^2+qx-r=0$ be given in which p is not divisible by 3, by supposing $x=\frac{z+p}{3a}$ the transformed equation reduced is $z^3-\overline{3p^2+9aq}\times z-2p^3+9apq-27a^2r=0$, wanting the second term, having 1 for the coefficient of the first term, and the coefficients of the others all integers.

General Corollary to the preceding Propositions.

If the roots of these transformed equations be found by any method, the roots of the original equation will be found from the simple equations expressing their relation.

These principles and operations will supply rules for resolving equations of all orders; and the student who is desirous of more particular information may consult Bonnycastle's Algebra; from whence he may proceed to the Treatises of Frend, and Simpson.

ALGENEB, a fixed star of the second magnitude in the right shoulder of Perseus.

ALGOL, a fixed star of the second magnitude in the constellation of Perseus, otherwise called Medusa's head. This star has been subject to singular variations, appearing at different times of different magnitudes.

ALGOMEIZA, a name given to the star Procyon.

ALGOR, an obsolete medical term denoting unusual coldness in the body.

ALGORAB, a fixed star of the third magnitude in the right wing of Corvus.

ALGUAZIL, an officer in Spain similar to a constable.

ALHIRTO, a fixed star of the third magnitude in Capricorn; sometimes called *rostrum gallinæ*.

ALIAS, a law term for a person going by two names.

ALIBI, in law, the absence of a person accused from the place where he is charged with committing an offence.

ALIEN, in law, a person born in a foreign country, as distinguished from a natural born subject. An alien is incapable of inheriting land in England, till he is naturalized by act of parliament. *Alien duty*, an additional impost laid on all goods imported into Britain by aliens. *Alien priories*, were monasteries in England which were appendages to foreign abbeys.

ALIENATION *Office*, the place to which are taken all writs of covenants and entry upon which fines are levied.

ALIMENT, food in general, both solid and liquid, from which by digestion chyle is prepared, and a proper supply of nutrition afforded to the body.

ALIMENTARY *Children*, among the Romans, were those brought up in public buildings like our charity-schools. *Alimentary law* was that by which children were obliged to maintain their aged parents.

ALIMENTARY *Duct*, that which is sometimes called the thoracic duct. It is also applied by some to the intestines on account of the food which passes through them.

ALIMONY, in law, the maintenance to which a woman is entitled in case of separation from her husband.

ALIPILARIUS or ALIPILIUS, among the Romans, a servant belonging to the baths, who by means of an instrument called volsella, took off superfluous hairs from the bathers.

ALIQUANT *Parts*, in arithmetic, those numbers which cannot measure any other without leaving a remainder.

ALIQUOT, that part of a number which will measure it exactly without leaving a remainder; thus 2 is the aliquot part of 4, 3 of 9, 4 of 16, &c.

ALISMA, or Water plantain, a genus of plants of the class and order hexandria polygynia. Its characters are calyx, three leaved; petals three, seeds several. There are nine species, all natives of Britain. They inhabit watry places.

ALKAHEST, in chemistry, a supposed universal menstruum capable of resolving all bodies into their first principles. The notion is now treated with just contempt.

ALKALESCENT, a substance slightly alkaline, or in which alkali is begun to be formed.

ALKALI, in chemistry, a word taken from the Arabic, and applied to the plant called *kali*, which being burnt and the ashes washed in water gives a substance called alkali. The word is now applied to all substances which have a caustic taste; are capable of being volatilized by heat; of combining with acids; of being soluble in water, and of changing vegetable blues to green. The alkalies are three: potash, soda, and ammonia. The two first are called fixed alkalies, and require a red heat to volatilize them; the last is termed volatile alkali, from its being soon dissipated by heat. Alkalies readily combine with sulphur, forming compounds which absorb the oxygen from the atmosphere, and when moist give out a fetid gas. These compounds used to be called alkaline hepars or livers, but are now named sulphurets. The alkalies act powerfully on most vegetable and animal substances, reducing them to a pulp. With oils they make soap. They unite with all the acids and produce neutral salts; in which the properties of both alkali and acid are no longer seen. Alkalies decompose the acid solutions of all metals and most earths. Professor Davy has recently decomposed the alkalies by Galvanism, and discovered them to contain a metallic principle.

Alkaline earths, are those which possess the acrid qualities of the alkalies, and have also the property of solubility in water to a certain extent; of changing blue and red vegetable colours to green; and of absorbing carbonic acid.

ALKERMES, a cordial made of rose-water, sugar, cinnamon, kermes, &c. It is now out of use.

ALLAMANDA, in botany, a genus of the pentandria monogynia class and order. The corolla is monopetalous; and the essential character is, corolla contorted, capsule lens-shaped, erect, echinate, one-celled, two-valved, many-seeded. The only species is the allamanda cathartica which grows in Guiana. The leaves are cathartic.

ALLEGATA, a subscription used by the Roman emperors, importing that the writings were verified.

ALLEGIANCE, in law, the obedience due from a subject to his sovereign. The oath of allegiance in England may be tendered to all persons above the age of twelve years.

ALLEGORY, a figure of rhetoric, wherein something else is signified than the words express in their real meaning, or it is a chain of metaphors continued through a discourse. The 80th psalm is a beautiful allegory.

ALLEGRO, in music, an Italian word signifying that the part is to be played in a lively manner.

ALLEMAND, a grave solemn music, with a good measure and a slow movement: also a dance.

ALLERION or ALERION, in heraldry, a kind of eagle without beak or feet, having nothing perfect but the wings which are expanded.

ALLEVEURE, a small copper coin in Sweden, value about two-pence farthing.

ALLEY, in perspective, that which is made wider at the entrance than at the termination.

ALLIANCE, in law, the relation between two parties by marriage. Also a treaty between sovereign princes for their mutual safety.

ALLIGATI, among the Romans, the vilest kind of slaves.

ALLIGATION, in arithmetic, the rule of mixture. There are two kinds, *medial* and *alternate*. Alligation medial, from the rates and quantities of the simples given, discovers the rate of the mixture. Alligation alternate, finds the quantities of the simples from their rates, and the rate of the given mixture.

ALLIGATOR. See *Lacerta*.

ALLIOTH, a star in the tail of the great bear, used for finding the latitude at sea.

ALLITERATION, an ornament chiefly used in poetry, consisting of the repetition of the same letter at certain intervals, as

*‘Fields ever **fresh**, and **groves** for ever **green**.’*

ALLIONIA, a genus of plants of the class and order tetrandria monogynia. The corolla is one-petalled and funnel-shaped; and the essential character is calyx common, oblong, simple, three-flowered; proper obsolete, superior; corolla irregular; receptacle naked. There are two species, natives of South America.

ALLIUM, *Garlick*, a genus of plants of the hexandria monogynia class and order. The corolla is six-petalled, and the essential characters are, corolla six parted, spreading; spathe many-flowered; umbel-leafed capsule, superior. This genus comprehends *ium porrum*, or leek; *the allium ce-* onion with all their varieties; the ot or shallot: the common garlick, scambole, the molys, and a consider- tribe of flowering ornamental garlicks, 145 species.

LLODIAL, an inheritance held with- acknowledgment to a superior: allo lands are those which are free from s or service.

LLONGE, a term in fencing for a ist or pass at an antagonist.

LLOPHYLUS, in botany, a genus of octandria monogynia class and order, d of the natural order of guttiferæ. ere are five species natives of the East d West Indies.

ALLOTTING, or *Allotment of Goods*, in mmerce, the dividing a ship's cargo in- parts which are purchased by several ersons.

ALLOTMENTS *of Land*, portions of round granted to claimants on the divi- ion and inclosure of commons and wastes.

ALLOY or ALLAY, the mixture of a base metal with a fine one. The alloy of gold is estimated by carats, that of silver by pennyweights. Gold coin has an alloy of silver and copper, and silver of copper only; the proportion for the first being two carats of alloy in a pound troy of gold; and in the latter 18 pennyweights of alloy for a pound troy of silver. The coins of different nations vary much with respect to the proportions of alloy.

ALLUMEE, in heraldry, a term applied to the eyes of beasts when painted red or fiery.

ALLUSION, a figure in rhetoric by which reference is made to one thing in order to illustrate another to which it is similar.

ALLUVIAL *Limestone*, a kind of stone supposed to have been formed by the deposition of calcareous matter in a state of solution in water.

ALLUVION, in law, the gradual increase of land by the sea-side or banks of rivers: when gradual, it is the property of the next land-owner, but if a large portion of land is suddenly torn away and joined to a neighbouring estate, it belongs to the king.

ALMAGRA, in natural history, a fine red ochre used in painting and medicine.

ALMANACK, a book or table, containing a calendar of time, the rising and setting of the sun, age of the moon, eclipses, &c. The common almanacks have also matters added to them, as frivolous prognostications, &c. The *Nautical Almanack*, is published under the direction of the commissioners of longitude, and contains many valuable articles for the use of mariners.

ALMEISAR, a game used by the antient Arabs, performed by casting lots with arrows.

ALMENDINE, a kind of ruby, but softer and lighter than that of the east.

ALMENE, a weight of two pounds used to weigh saffron in the East Indies.

ALMOND, in commerce, a Portuguese measure for oil: twenty-six making a pipe.

ALMOND-*Furnace, among refiners that* in *which the flags of litharge, left in refin*ing silver, are again reduced to lead by charcoal.

ALMONER, an officer whose duty it is to distribute alms to the poor. The lord high almoner in England is an ecclesiastical officer who has the forfeiture of all deodands and the goods of felos-de-se, which he is to distribute to the poor.

ALMS, a general term for charitable donations, also lands or other effects bequeathed to churches or religious houses on condition of praying for the soul of the donor.

ALMUCANTERS, in astronomy, the same with regard to the azimuth and horizon as the parallels of latitude are to the meridians and equator.

ALNAGE, or AULNAGE, the measuring woollen goods with an *aul* or ell. Alnage was originally designed as a test of the goodness of the article to which a seal was applied. There was an officer for this purpose called aulnager, but the office is now abolished.

ALOA, among the Greeks, a festival kept by husbandmen in honour of Ceres.

ALOE, in botany, a genus of plants having a liliaceous flower, consisting of one tubular petal, divided into six deep segments at the edge; the fruit is an oblong capsule, with three cells, and containing a number of seeds.

Some aloes have many branches like trees, others are small and grow close to the ground. There are fourteen species, with many varieties. It is from two varieties of the tree aloe that the medicine of that name is obtained. The hepatic aloe is from the Barbadoes aloe; and the succotrine from the sweet aloe. The partridge-breasted, or variegated, and the mitriformis are the most beautiful; but the largest species is the A. humilis which is a native of the Cape of Good Hope. Most of the species are tender, and must be sparingly watered in winter.

ALOES, in pharmacy, the juice of the aloe, prepared from the leaves when fresh cut, which juice when dried in the sun becomes a hard yellow substance. Its virtues are purgative.

ALOE *Rosata*, a preparation of succotrine aloes, which dissolved in the juice of roses and exposed to the sun, or put over a slow fire, becomes thick enough to make pills.

ALOFT, in sea-language, any thing above the tops.

ALOGOTROPHIA, a medical term for an unequal nutrition or growth of some part of the body.

ALONG, a ship is said to lie along when her side is pressed down towards the water by the sails

ALOOF, or LUFF, an order to the man at the helm to keep the ship nearer the wind.

ALOPECIA, a medical term for the loss of hair by the want of nutriment or bad humours.

ALOPECURUS, *Foxtail Grass*, a genus of plants of the triandria digynia class and order. There are seven species. The A. pratensis, or meadow foxtail, has been valued by some farmers, but apparently be*yond its desert*

ALOUCHI, a sweet scented gum, *uded from* the white cinnamon tree.

ALPHABET, the natural or customary series of the several letters of a language. The word comes from *alpha* and *beta* the two first letters in the Greek alphabet. The number of letters is different in different languages. In the English there are 24 letters, to which if *j* and *v* consonant are added, the sum is 26; the French contains 23; the Hebrew, Chaldee, Syriac, and Samaritan 22 each; the Arabic 28; the Persian 31; the Turkish 33; the Georgian 36, the Coptic 32; the Muscovite 43; the Greek 24; the Latin 22: the Sclavonic 27; the Dutch 26; the Spanish 27; the Italian 20; the Ethiopian and Tartarian each 202; the Indians of Bengal 21; the Baramese 19. The Chinese have no alphabet, except their whole language be so called; for their letters are words or hieroglyphics amounting to about 80,000.

ALPHERATZ, a fixed star of the third magnitude in Aquarius.

ALPHONSIN, in surgery, an instrument for extracting gun-shot wounds, so called from the inventor Alphonsus Ferner, a physician of Naples.

ALPINIA, in botany, a genus of the monandria monogynia class and order. The corolla is monopetalous and tubulose: and the essential character is, calyx three-toothed, equal, tubulose; corolla three-parted, equal; nectarine two-lipped. It is a native of the West Indies; and is reared with us in stoves.

ALQUIER, a Portuguese liquid measure, two of which make an almond.

ALQUIFORE, or *Potter's Ore*, a kind of mineral lead, used by potters to give a green varnish to their works. It is found in Cornwall and Wales.

ALSINE, *Chickweed*, a genus of plants of the class and order of pentandria trigynia. The essential character is, corolla five equal petals; calyx five-leaved; capsule one-celled, three-valved. There are several species, but only one in England; which is very troublesome to gardeners.

ALSTONIA, in botany, a genus of the polyandria monogynia class and order. The corolla is shorter than the calyx; and the essential character is, corolla one petalled, eight or ten cleft, the clefts alternated. The only species is a native of South America.

ALSTROEMERIA, a genus of plants of the hexandria monogynia class and order, and of the natural order of lilia. The characters are, corolla six petals, nearly bilabiated; the two inferior petals at the base; stamina bending down. There are six species all natives of South America.

ALT, in music, signifies high, and is frequently to be understood in the comparative degree; as, octave alt, an octave higher.

ALTERANTS, or *Alterative Medicines*, are those which correct the bad qualities of the blood and other animal fluids.

ALTERN BASE, in trigonometry, a term used in contradistinction to the true base. Thus in oblique triangles the true base is either the sum of the sides, and then the difference of the sides is the altern base; or the true base is the difference of the sides, and then the sum is the altern base.

ALTERNATE, in heraldry, a term used in respect to the situation of the quarters. Thus the first and fourth quarters and the second and third being generally the same, are called alternate quarters. *Alternate*, in botany, means that disposition of the leaves of a plant when the first on one side of a branch is higher than the first on the other side, and so on with the rest.

ALTERNATION, the changes of orders in any number, called also permutation; and is found by a continual multiplication of all the numbers; thus, to know how many changes can be rung on six bells, multiply the numbers 1, 2, 3, 4, 5, 6, continually into one another, and the last product is the answer.

ALTERNATIVE, denotes the choice of two things proposed; in which sense we say, take the *alternative* of two propositions.

ALTHÆA, the *marsh mallow*, a genus of plants, with a double calyx, the exterior divided into nine segments; the fruit is made up of numerous capsules, each having a single seed. It is of the class and order monadelphia polyandria; and there are seven species of which the common marsh mallow is well known.

ALTIMETRY, the art of measuring altitudes or heights, accessible or inaccessible.

ALTINCAR, in mineralogy, a kind of factitious salt used in fusing and purifying metals.

ALTITUDE, or height, in geometry, one of the three dimensions of the body; altitude of a figure is the nearest distance of its vertex from the base. See *Trigonometry*.

ALTITUDE, in optics, is the height of an object above a line parallel to the horizon from the eye of the observer. *Altitude of the eye*, in perspective, is its perpendicular height above the geometrical plane.

ALTITUDE *of a Star*, &c. in astronomy, is the distance of the star, &c. from the horizon; which altitude may be *true* or *apparent*. If it be taken from the real horizon, the altitude is true; if from the apparent or sensible horizon, the altitude is apparent. Or rather, the apparent altitude is that which appears to our observation, and the true is that from which the refraction is subtracted. The true altitudes of the sun, &c. differ but little from their apparent altitudes, on account of their distance from the earth's centre, and the smallness of the earth's semi-diameter compared thereto.

Sailors take the altitude of the sun and stars with a quadrant, which method being liable to error, Mr. Parent has given a way of finding the altitudes by a common watch; thus, having observed the difference of time between the rising of two stars, the right ascension and declination of which are known, it is easy to distinguish that part of the difference which arises from that different position, from that arising from the obliquity of the sphere. This last is the altitude of the pole of the place of observation.

ALTITUDE, *Refraction of*, the arc of a vertical circle, by which the altitude of a celestial body is increased by means of refraction. The *parallax of altitude* is the difference between the true and apparent place of a star.

ALTITUDE of Motion, the measure estimated in the line of direction of the mov-

, a sort of sheep's leather, one
ich has the word on
LS, in chemistry, earthen pots
ottoms, inserted into each other,
n sublimating.
RIUM, in anatomy, the bottom
cha, or hollow of the outer ear.
term applied to bee-hives.
LATE, in botany, a term signi-
ame as *honey-combed*.
LUS, in natural history, the
e waxen cells in bee-hives; also
l of a conical form composed of
of cells. In anatomy, alveolus
et in which a tooth is fixed.
Notha, a spurious wing or an
to the principal wing in birds,
of the primary quill feathers.
a neutral salt, the base of which
, argil, or clay, combined with
acid. There are four varieties
. Sulphate of alumina and pot-
lphate of alumina and ammo-
upersulphate of alumina and
. Supersulphate of alumina
nia. The two last are generally
ed alum; the two first being
minated alum. Alum used to
d from the east till the fifteenth
when alum-works were esta-
Italy. In the reign of Queen
an alum-work was set up in
Native alum is mixed with he-
us matters, or effloresces in va-
s upon the ores during calcina-
re are several kinds, which dif-
ne another only in being mixed
salts which are not of the alu-
nd. That called the Roman alum
ed the best. It is met with in
tals and has a reddish colour.
kinds contain a portion of vitrio-
, or sal ammoniac, according to
of the alkali used in its prepa-
lum is properly a triple salt,
of sulphuric acid, alumina and
ammonia, united. It is of im-

are pointed. It is of the class of ant-eaters.

ALURNUS, a genus of insects of the order of coleoptera, with filiform antennæ, six short feelers, and a horny arched jaw. There are three species, natives of the Cape of Good Hope.

ALYSSUM or ALYSSON, *madwort*, from its supposed virtue in curing madness, a genus of plants of the tetradynamia siliculosa class and order. There are nineteen species, but none of them remarkable except the halimifolium or madwort, with whole spear-shaped leaves, which spreads itself on the ground and produces at the ends of its branches tufts of small white flowers. It is a very hardy plant.

AMADOW, a kind of tinder or touchwood, brought from Germany, made from spungy excrescences which grow on old trees.

AMADOWRY, a sort of cotton imported from Alexandria.

AMAIN, a sea-term denoting to lower a thing at once.

AMALGAM, a mass of mercury incorporated with some other metal. Amalgams become soft with heat, and hard with cold; and the metals amalgamated are harder or softer in proportion to the quantity of mercury employed. Amalgams are used by gilders in laying gold on other metals.

AMALGAMATION, in chemistry, the operation of making an amalgam, or mixing mercury with any metal. This is done by fusing, or igniting the metal, and adding the mercury to it, on which they mutually attract each other. The amalgam of gold is thus made: take a dram of gold, beat it into thin plates, and on these heated in a crucible red hot, pour an ounce of quicksilver; stir the whole with an iron rod, and when it begins to fume cast it into an earthen pan filled with water, where it will coagulate.

The amalgam of tin and mercury for looking-glasses is thus made: the glass stigmata, simple and persistent; the pericarpium an ovate capsule, three beaked unilocular, and cut round; seed one. There are 29 species, the principal of which are the A. bicolor, melancholicus, or two-coloured amaranthus; A. maximus, or tree-like amaranthus; A. oleraceus, used by the Indians for cabbage; A. tricolor or three-coloured amaranthus which is cultivated in our gardens. The amaranths are all annuals.

AMARYLLIS, in botany, a genus of the hexandria monogynia class and order, and of the natural order of lilia. Its characters are, corolla hexapetaloid, irregular; filaments inserted in the throat of the tube, bending down. There are 29 species well known in our stove and green-houses. The flowers are very beautiful.

AMASONIA, a genus of the didynamia angiospermia class and order. Cor. onepetalled, tubulous; limb small, quinquefid; the seed an ovate nut. There is but one species, which is a native of Surinam.

AMAUROSIS, a distemper of the eye, better known by the name of ***gutta serena***.

AMAUSA, pastes used for counterfeiting gems.

AMAZONS, a fabulous race of women said to have inhabited Amasia in Lesser Asia. They are described as cutting off their right breasts to fit them for martial exploits. But the existence of such a nation is justly exploded.

AMAZONE, an antique statue representing the queen of the Amazons. It is in the gallery of antiques at Paris.

AMBASSADOR, a public minister sent from one sovereign to another. Ambassadors are ordinary or extraordinary. An ambassador in ordinary is one who constantly resides at a foreign court; but an ambassador extraordinary is one sent on an especial occasion only, and who returns when his mission is ended. The persons of ambassadors are free from arrests, and so are their goods from seizure. Their servants also have the like privilege if registered in the office of the secretary of state.

AMBE, in surgery, an instrument for reducing dislocated bones. It is also a term in anatomy for the superficial jutting out of a bone.

AMBER, in natural history, a bituminous transparent substance generally of a yellow or brown colour, though with some varieties. The specimens most esteemed are of a pale yellow colour. When slightly rubbed it becomes electric; and the odour which it exhales resembles the aromatic resinous substances. It fuses in a strong heat, and is employed in this state in the composition of some varnishes. There is some doubt whether amber is an original fossil or produced from vegetable matter, but though it is found at great depths, on examination it bears evident marks of having been produced at the surface of the earth; vegetables and insects being occasionally found in it. The greatest part of what we have comes from the Baltic, where it is usually found floating on the waves, being washed out of the soil. Some of the most beautiful specimens were in the King of Prussia's cabinet.

AMBERGRIS, an unctuous inflammable substance variegated like marble, very light, and has a fragrant odour when heated. It melts freely over the fire into a kind of yellow rosin, and is hardly soluble in spirit of wine. It is found swimming on the sea, or left upon the shore, in the Atlantic, on the sea-coast of Brazil, Madagascar, Africa, the East Indies, &c.; but most of the ambergris we have, comes from the Bahamas. It is also found in the abdomen of the spermaceti whale when in a diseased state. The use of ambergris is nearly confined to perfumery, though it has been found to be a purgative. Genuine ambergris may be known by its fragrance when a hot needle is thrust into it.

AMBIDEXTER, a person who can use both hands with the same ease. It is a term also applied to those persons who act on both sides.

AMBIENT, a term applied to fluids which completely surround substances; thus the air is called an ambient fluid from its encompassing the whole globe.

AMBIGINAL *Hyperbola*, in conics, the name of one of the triple hyperbolas of the second order, having one of its legs within an angle formed by the asymptotes and the other without.

AMBIGUITY, in grammar and rhetoric, that deficiency in language which renders words equivocal.

AMBIT, in geometry, the same with what is called the perimeter of a figure.

AMBITUS, among the Romans, was a term applied to the act of soliciting the people for their votes at an election to an office. From hence comes the word *ambition*. In music, *ambitus* signifies the extent of a tone, or the modification of grave and acute.

AMBLE, in horsemanship, that pace by which a horse's two legs of the same side move at the same time.

AMBLYGON, in geometry, an obtuse angled triangle, one of whose angles is more than 90°.

AMBROSIA, in botany, a genus of plants of the monoecia pentandria class with flosculous flowers. Of this genus there are five species, one of which is perennial and may be propagated by cuttings or seeds. The plants are moderately hardy, but in winter they must be kept in a greenhouse.

AMBROSINIA, a genus of the class and order gynandria polyandria: spathe, one leaved, in two parts, stamina on the inner, pistils on the outer. It is a native of Sicily, but grows here in greenhouses.

AMBULANTS, brokers or exchange agents, who have not been sworn before magistrates.

AMBULATION, a surgical term applied to the spreading of a gangrene or mortification.

AMBULATORY, a name given to those courts formerly which were not stationary but removed from one place to another. *Ambulatory will*, is that which can be revoked before a person's death.

AMBULIA, in botany, a genus of the didynamia angiospermia class and order. It is an aromatic, and grows in Malabar.

AMBURBIUM, among the Romans, was a procession round the city previous to a solemn sacrifice to avert some public evil.

AMBURY, or ANBURY, in farriery, a soft tumour filled with blood.

IDE, in the old French
punishment levied on
offences. The *amende*
nisument inflicted on
r sacrilegious persons,
ound the court with
necks, and asking
king, the court, and
n sending the crimi-
the gallies.
law, the correction
ted in a process. A-
is an alteration made
it. In husbandry,
ennching of land by

a botanical term ap-
ers which hang down
ail, called also amen-
ng the Romans amen-
tened to a javelin;
fastened their san-

or AMERCIAMENT,
pon offenders at the
t.
botany, a genus of
dria class and order,
der of the papiliona-
There are two spe-
and the other a tree
t Indies. The wood
y the name of ebony.
hystus, in natural his-
y of a purple colour,
s, sometimes nearly
ding to a pale rose-
d to a colourless state
e fire, after which it
id except in hardness.
ed to it the virtue of
ion, whence it was
kers to wear it about
und of various sizes.

and iron. There are several species of amianthi, the properties of which are extraordinary. They will not give fire with steel, nor ferment with aqua fortis, and on being thrown into the fire, will endure the greatest heat without being injured. The threads have been used as wicks for perpetual lamps.

AMICABLE *benches*, among the Romans were seats placed for the inferior magistrates, called *amici*.

AMICULUM, an upper garment worn by the Roman women.

AMICUS CURIÆ, in law, a by-stander who informs the court of some matter which is doubtful or mistaken.

AMIESTHS, cotton cloths, imported from the East Indies.

AMIRANTE, an officer in Spain, equivalent to lord high admiral.

AMITTERE *Legem Terræ*, a law term, denoting the being deprived of the right of swearing in any court.

AMMAN or **AMMANT**, in German polity, a judge who has the cognizance of civil causes. Among the French it means a notary.

AMMANIA, in botany, a genus of plants of the tetrandria monogynia class and order: the flower is composed of four oval patent petals, within the cup; and the fruit is a capsule covered by the cup, and having four cells. There are seven species, all annuals and natives of hot climates.

AMMI, *Bishop's Weed*, in botany, a genus of umbelliferous plants of the pentandria digynia class and order. The flower is rosaceous and composed of heart-like petals, and the fruit a roundish capsule, containing two striated seeds. There are three species all annual

AMMOCHUGSOS, the name of a stone which is a species of mica with spangles of a gold colour. In a state of powder it is used as a sand for writing.

not corrode animal bodies. It combines rapidly with cold water, which absorbs it instantly, in which state it is usually employed by chemists. Ammoniacal gas is not changed by light; but if electric sparks pass through it, the volume of gas is encreased and will be converted into hydrogen gas, and azotic gas. This gas has no effect upon oxygen gas while cold; but if a mixture of the two be passed through a red-hot porcelain tube, a detonation is produced, water is formed, and azotic gas discharged; therefore ammonia is combustible. Its hydrogen combines with the oxygen and forms water while the azote escapes in the form of gas. If the proportion of oxygen is large, nitric acid will be formed. The same decomposition and detonation are effected when common air is used instead of oxygen. Of the simple combustibles sulphur only combines with ammonia, and in a state of vapour forms a sulphuret which decomposes water and forms hydrogenated sulphuret of ammonia. This gas being passed through phosphorus in a red-hot porcelain tube, is decomposed and forms phosphuretted hydrogen gas, and phosphuretted azotic gas. Passed through red-hot charcoal it forms Prussic acid. Combined with muriatic acid it forms the muriat of ammonia. Though ammonia combines with the metals, it changes some of them into oxides and dissolves them, as copper and zinc, tin and iron.

Ammonia forms with the peroxides of gold and silver the two compounds called fulminating gold and silver. From the accurate experiments of M. Berthollet it appears that ammonia is composed of 121 parts of azote and 32 of hydrogen.

Liquid ammonia is made by ammoniacal gas in water.

AMMONIAC, or *Gum ammoniacum*, in the materia medica, is a resinous substance extracted from a tree which grows in Africa and Asia. The best ammoniac is of a yellow colour without, and white within, of an astringent taste, and smelling like castor.

AMMONIAC, *Sal.* See *Chemistry*.

AMMONITÆ, in natural history, the same as the cornua ammonis or snake stones.

AMMOSCHISTA, a kind of stones of a laminated structure and splitting horizontally or into flat plates.

AMMUNITION, a general term for warlike stores.

AMNESTY, in political concerns, is a general or conditional pardon granted by a sovereign to his rebellious subjects.

AMNIOS, a thin pellucid membrane, which surrounds the fœtus.

AMŒBŒUM, a poem in which two persons speak alternately in the same number of verses, as the third and seventh eclogues of Virgil.

AMOGLOSSUS, a sort of flat fish resembling a soal, called also a lantern.

'AMOK, a word used in the East Indies by slaves and others who considering themselves injured, run about and kill every one they meet. Our sailors call it *running a mock*.

AMOMUM, in botany, a genus of the *monandria monogynia* class and order. *There are twelve species*: the principal are, 1. *amomum zinziber*, or common a native of the East Indies, where it naturally. The roots are jointed, spread on the ground; they put green stalks in the spring which height of two feet and a half with leaves. The flower stems rise by of these, ending with an oblong from which is produced a blue All the species are tender, and raised here but in stoves. 2. *rumbet*, or wild ginger, is a native dia. It grows to the height of and the flower is white. 3. *damomum*, or cardamom, is a India. Its seeds are used in 4. *Amomum grana Paradisi*, is tive of India. The fruit contain grains of Paradise is about the having three cells, in each of two small seeds. The dried first species are used in cookery in medicine; the green roots are ed as a sweetmeat. The ginger, and grains of Paradise are good and in debility of the intestines.

AMOMUM, in the materia med seed of an aromatic plant, and teemed as a diuretic and ape now out of use.

AMOPHILA, a name given to genus of hymenopterous insects

AMORPHA, in botany, a genus of the diadelphia decandria class There is only one species which is gant shrub commonly called bast digo. It is a hardy plant.

AMORTIZATION, in law, the tion of lands or tenements to a cor also the privilege of taking lands, mortmain with the king's consent.

AMPELIS, in ornithology, the a genus of birds of the order of the tongue has a margin all round, bill is conical and straight. Th seven species, all natives of forei tries, except the garrulus, which tive of Europe and the West Indi are gregarious, and feed on grass vineyards are cultivated. In they appear in Scotland and in berland where they feed on the the mountain ash. This species the size of a blackbird: the bill thick, and black; on the head is the lower part of the tail is bl end yellow; the quill feathers a the first three tipt with white, next edged with yellow, and the white.

AMPELITES, *Cannel Coal*, a sol fossil, very hard, not fusible, but flammable, and burning rapidl found in Lancashire and Scotland is termed *Parrot coal*. It takes a lish and is frequently made i ments.

AMPHERES, in antiquity, a sc sels wherein the rowers plied tw the same time.

AMPHIARTHROSIS, an ar term comprehending those jun the bones which have a manifes and differ from the articulations arthrosis in figure or motion.

AMPHIBIA, the third class of a the Linnæan system, and compri which have the power of living

erm applies also to the
and some others, who
occasionally into the
ores. Most of the am-
e fitted for their mode
eculiar structure of the
men ovale, &c. Dr.
phibious animals into
hose which live chiefly
ionally go into the wa-
phocæ or seal tribe,
odiles, the hippopota-
which chiefly inhabit
netimes go on shore;
ter-serpents, or snakes
ne kinds of insects, and
hibious.

, in grammar, denotes
t speech capable of dif-

YS, in antient poetry,
hree syllables, the mid-
e other two short.

in natural history, a
e, having several pro-
s much used by the an-
s.

S, an assembly of depu-
nt Grecian states, some-
of the German empire.
twice a year.

. in antient poetry, a
hree syllables, of which
ere long, and the mid-

LOS, an upper garment
having two short sleeves
ow.

the head magistrates of

mong the Greeks, were
ged two horses without

, among the antients,
a prow at each end.

was also a dry measure among the Romans of this name, containing three bushels. The Venetians have a measure called an amphora which holds fourteen quarts. The Romans distinguished the wine kept in earthen vessels by the name of *amphorarium vinum*.

AMPHOTEROPLON, a kind of insurance where the underwriters run the risk both of the outward and homeward voyage.

AMPHOTIDES, among the antient pugilists, a covering for the ears to prevent their adversaries from laying hold of them.

AMPLIATION, among the Romans, was the postponing a cause for want of sufficient evidence. This was done by the judge either pronouncing the word *amplius*, or writing the letters *N. L.* i. e. *non liquet*, the cause is not clear.

AMPLIFICATION, in rhetoric, that part of a discourse in which praise is heightened or a crime is aggravated, or a narration enlarged, to make the greater impression on the mind.

AMPLITUDE, in astronomy, an arch of the horizon intercepted between the east or west point and the centre of the sun, or a planet at its rising and setting, and therefore is either north or south. The sun's amplitude, either rising or setting, is found on the globes by bringing the sun's place to the horizon, on the east or west side, and the degrees from the east to the north or south are the amplitude. To find the amplitude by trigonometry, say, as the cosine of the latitude : radius : : sine of the declination : to the sine of the amplitude.

AMPLITUDE *Magnetical*, is the different rising or setting of the sun from the east or west points of the compass; and is found by observing the sun at his rising and setting by an amplitude compass.

AMPLITUDE *of the Range of a Projec-*

Arabs, who give them the name of talisman.

AMUSETTE, a warlike instrument, mounted like a cannon, but fired in the same manner as a musket.

AMY, in law, the next relation appointed guardian to an infant.

AMYGLADOIDES *Lapis*, in natural history, a fossil resembling the kernel of an almond. It is the petrified spine of a species of *echinus marinus* or sea urchin.

AMYGDALUS, the almond and peach; a genus of the monogynia order, and of the class icosandria, and in the natural method of the order pomaceæ. The characters are, calyx a single-leaved perianthium beneath, tubular and quinquefid: corolla five oblong petals inserted into the calyx; the stamina thirty slender erect filaments, half as long as the corolla, and inserted into the calyx: anthera simple; the pistillum has a round villous germen above; a simple stylus, the same length as the stamina; and the stigma headed; the pericarpium a large round villous drupa, with a longitudinal furrow: the seed an ovate. The nut of the almond is covered with a dry skin, that of the peach and nectarine with a pulp. The nectarine is smooth, the peach downy. There are seven species with numerous varieties. The principal are, 1. *Amygdalis communis*, or common almond, a native of Africa; it grows to the height of near 20 feet. The white flowering almond is of this species. 2. *A. nana*, the dwarf almond a native of Asia Minor. There are two varieties of this shrub which grow about four feet high. 3. *A. Persica*, the peach, a native of Europe. The principal varieties are: 1. Admirable. 2. Beautiful Chevreuse. 3. Bellegarde. 4. Bloody Peach. 5. Bourdine. 6. Catherine. 7. Chancellor. 8. Early Purple. 9. Great French Mignon. 10. Late Admirable. 11. Late Purple. 12. Malta. 13. Monstrous Pavy. 14. Montauban. 15. Nivette. 16. Old Newington. 17. Persique. 18. Portugal. 19. Rambouillet. 20. Red Magdalen. 21. Red Nutmeg. 22. Rosanna. 23. Royal. 24. Small Mignon. 25. Smith's Newington. 26. Venus's Nipple. 27. Vineuse. 28. White Magdalen. 29. White Nutmeg. 30. Yellow Alberge. 31. Noblesse. 32. Double Montagne.

4. *Amygdalis Muci-Persica*, or the nectarine. The principal varieties are, 1. Elruge. 2. Golden. 3. Italian. 4. Murrey. 5. Newington. 6. Roman. 7. Scarlet. 8. Temple's. 9. Clermont's. 10. Fairchild's early.

The best of all these species are propagated by budding or inoculating. They thrive best against any wall, except the north, but a south aspect is best. Care is to be taken in pruning to leave enough of the young wood, and not lay the branches too close or to cross each other.

AMYRIS, in botany, a genus of the octandria monogynia class and order; and of the natural order of terebintaceæ. There are nine species: the principal of which are, 1. *A. balsamifera*, or rose-wood, which is a native of the West Indies. It grows to a great height, and the trunks have large protuberances on them. The leaves are lamel-shaped; the blue flowers are on a branched spike; and the berries are black. 2. *A. elemifera*, a shrub which bears the gum elemi. It is a native of South America, and grows to the height of six feet. 3. *A. Gileadensis*, or opobalsamum, is an evergreen shrub which grows in Arabia Felix, from whence the balm of Gilead is procured. 4. *A. toxifera*, or poison-wood, is a small tree, from the trunk of which a black liquid distils; birds, however, feed on the fruit. It is a native of the Bahamas.

AMZEL, the name of a bird of the merula or blackbird kind. There are two species: the ring amzel, or merula torquata, and the merula montana called simply the amzel. The first is somewhat larger than the common blackbird. Its back is of a dark brown, the throat and breast spotted and streaked with white, and the lower part of the throat has a broad white ring of a lunated shape. The wings and tail are blackish, but in the female they are variegated with white. The bird feeds on insects and berries, and is common in Derbyshire where it is called the *rock ouzel*.

AN JOUR and WASTE, is the forfeiture of lands for a year and a day to the crown by those who commit petit treason and felony; afterwards they fall to the lord.

ANA, in medical prescriptions, signifies an equal quantity of ingredients, commonly written thus $\bar{a}$ or $\overline{aa}$. In literature *ana* is a termination added to books containing anecdotes and the sayings of eminent men as Scaligeriana, Huetiana, &c.

ANABATHEA, among the ancients were stones placed on the sides of roads to assist travellers in mounting their horses.

ANABIBAZON, in astronomy, the name of the northern node of the moon, called also Dragon's Head.

ANABLEPS, a genus of malacopterygious fishes, of which there is only one species known. It is found on the coast of Surinam.

ANABOLÆUM or ANABOLE, an ancient vestment resembling a great coat. Anaboleus was an appellation given to grooms of the stable or equerries.

ANACALYPTERIA, festivals held among the Greeks, on the day when the bride was allowed to lay aside her nuptial veil.

ANACARDIUM, the *Cashew-nut-tree*; a genus of the monogynia order, and of the decandria class of plants: and in the natural method belonging to the 12th order, holoraceæ. There is only one species which is the *anacardium occidentale*, a native of the West Indies. It grows to the height of twenty feet. The fruit is of the size of an orange, and full of an acid juice which is made use of for punch. At the apex of this fruit grows a nut of the size and shape of a small kidney, but larger at one end than the other. Between the shell and the kernel is a blackish juice of so caustic a quality as to blister the lips on touching it. The kernels are very sweet and sometimes used as a pickle. The ladies in the West Indies use the caustic liquor as a cosmetic, though they suffer much in the application. The plant is easily raised from the nut which should be planted in a pot s to its place with a similar

ETICUM, among the antients,
of a trumpet to rally flying sol-

NDO, in natural history, a name
e island of Ceylon to an enor-
le-snake which often devours
e travellers. Yet its flesh is
excellent.

EONTIC *Verse*, in poetry, a
me named after Anacreon con-
erally of three feet and a half,
and iambuses, and sometimes
as in Horace,

"*Lydia dic per omnes.*"

LUS, in botany, a genus of the
polygamia class and order. The
haracter is, receptacle, chaffy;
arginate; seeds, solitary with
us wings. There are four spe-
nnuals.

PLOSIS, in rhetoric and poetry,
on of the last word of a line, or
f a sentence, in the beginning
t. Also a medical term for the
f a cold fit in a semitertian fe-

OMOUS, a general name for
s which, at certain periods, go
vers into the sea, and after-
urn again.

EIA, among the Greeks, a stool
he accused person sat to make
e.

LLIS, in botany, a genus be-
the pentandria monogynia class.
The essential character is, co-
; capsule opening horizontally.
seven species. The A. *arven-*
mmon pimpernel, is a scarlet
led the poor man's weather-
n its opening in fine weather,
g on the approach of rain.
some foreign species with larger
ultivated in our gardens; parti-

oblique to the eye, ellipses; and those whose planes pass through the eye, will be right lines.

ANALEPTICS, a name given to restorative medicines.

ANALGISTA, among civilians, denotes a tutor who is not bound to give an account of his conduct.

ANALOGY, in philosophy, denotes a certain relation or agreement between two or more things which in other respects are very different. There is also an analogy between beings that have some conformity to one another, as between animals and plants; but still stronger between two different species of some animals. Analogy enters much into all our reasoning, and is of service in the way of illustration: but reasoning by analogy may be carried so far as to produce an erroneous conclusion. In botany, *analogy* denotes the resemblance of plants to each other in regard to their properties. Among geometricians it signifies a multitude of ratios.

ANALYSIS in logic, is a mode of tracing things back to their origin. It is likewise termed the method of resolution in opposition to the synthetic or method of composition. Among mathematicians it is the art of discovering the truth or falsehood, or the possibility or impossibility, of a proposition; which is done by supposing the proposition true, and then examining what follows, till we attain to some positive truth, or evident impossibility. Analysis is divided in respect to its object into finites and infinites. The former is called specious arithmetic, and the analysis of infinites is the same as fluxions. The analysis of powers is the resolving them into their roots. In chemistry, analysis is the reduction of a compound body to its first principles.

ANAMORPHOSIS, in perspective, is the projection or representation of an object on a plane in such a manner that it becomes distorted, but at a proper disanaplerotics are medicines which promote the growth of flesh in wounds and ulcers.

ANARCHI, in antiquity, a name given by the Athenians to the four supernumerary days in the year, during which they were without magistrates.

ANARCHY, in a political sense, is the want of government in a nation.

ANARRHICAS, a genus of malacopterygious fishes, called also lupus marinus, the sea-wolf. It is found in the northern seas, and is a very ravenous and fierce fish, feeding on crustaceous animals, crabs, lobsters, &c. In a fossil state the teeth of these fish are called *busonites*, or *toad-stones*.

ANAS, a genus of birds of the order of anseres, the beak of which is convex with an obtuse point, the tongue obtuse and fleshy. There are numerous species of this genus besides many varieties: the principal are: 1. *Anas aborea*, or black-billed whistling duck. It is a native of America. 2. *Anas acuta*, pin-tail, or sea-pheasant of Ray. It abounds in Iceland, and is esteemed an excellent food. 3. *A. Americana*, or American wigeon, inhabits North America from Carolina to Hudson's Bay. 4. *A. anser*, the goose; of which there are several varieties, two only of which we shall notice, viz. the *anser ferus*, or wild goose, and the *anser mansuetus*, or tame goose. 5. *A. bernicla*, is of a brown colour, variegated with black, and having a white colour. These birds, like the bernacles, visit our coasts in winter. They are common in Holland and Iceland. 6. *A. boschas*, the common wild duck; which are common in the fens of Lincolnshire, and are taken in the decoys. 7. *A. Canadensis*, is found in Hudson's Bay and Greenland, and in various parts of North America. It is now common in a tame state in England. 8. *A. candida*, the snow goose, so called from its prevailing colour, but the first ten quills are black with white shafts. They abound in Hudson's Bay, and are found in some parts of England in summer. 9. *A. casarca*, or ruddy goose, is common in the southern parts of Russia and Siberia. 10. *A. clangula*, or the golden eye of Ray, is common on our sea coast in winter, but goes to the north in spring. 11. *A. clypeata*, or shoveller of Ray, is sometimes seen in England, but not common. 12. *A. creca*, or common teal, is frequent in this island, and to the north as far as Iceland. 13. *A. cursor*, the race-horse, or logger-headed goose, which inhabits the Falkland Islands, &c; on account of the shortness of their wings, they are unable to fly, but they swim with great velocity. 14. *A. Cygnoides*, or the swan-goose of Ray, from Guinea, and there is also a variety of this species called the Muscovy goose. They are common with us. 15. *A. Cygnus*, or the swan, of the varieties of which we shall only notice two, the *ferus*, and the *mansuetus*. 16. *A. Erythropus*, or laughing goose, which is a native of Europe and America. They frequent the fens in winter, and migrate in March. 17. *A. fabalis*, the bean-goose, arrives in Lincolnshire in autumn and retires in May. The nail of the bill resembles a horse-bean. 18. *A. ferina*, pochard, or red-headed wigeon of Ray, frequents the fens in winter, and is known
London market by the name of du
19. *A. filigula*, or tufted duck of R
sometimes seen in England in the w
It is common in Russia. 20. *A. fus*
brown or velvet duck, which abou
Hudson's Bay and other parts of
rica. It is also sometimes seen on th
lish coast. 21. *A. galericulata*, or C
teal. It is a very elegant bird, a
native of China and Japan. 22. *A*
alis, or long-tailed duck, is frequent
northern regions: and visits our isl
the winter. 23. *A. histrionica*, or
spotted duck of Edwards, is a na
America and Greenland. 24. *A. magn*
great goose, is a very large bird,
found in Siberia. 25. *A. maula*, or
duck. This species feeds on sca
broken shell-fish. They vary much
one another in colour. 26. *A. mo*
ural duck of Pallas, is larger than th
It swims very quick but is unable to
27. *A. minuta*, or the little whit
brown duck of Edwards. This is
in various parts of Europe and Am
28. *A. mollissima*, or eider duck, is
the size of the common duck. It is
in the western isles of Scotland,
Norway, Iceland and Greenland,
whence the *eider down* is brought
quantities. This down is produced
breast of the birds in the breeding
The eider duck lays its eggs on the
and makes a nest for them of this
and the natives take away both the
and eggs. She will lay three times,
her eggs are then removed she qu
place. 29. *A. moschata*, or Muscovy
is a native of India. It has its name
gland placed on the rump which pr
a musky smell. 30. *A. nigra*, the
goose or sooter, is completely blac
the base of the bill is gibbous. It me
22 inches, and is found in the north
land and Scotland in the winter;
most common on the coast of Fran
A. querquedula, the garganus, or f
of Aldrovandus; it is also called th
mer teal. 32. *A. ruficolis*, or red-b
goose, is a beautiful species and is
only in the more northern regions.
spectabilis, abounds in Greenland,
down is as valuable as that of the
The skins sewed together make wa
ments. 34. *A. sponsa*, or the s
duck of Catesby, inhabits Mexico an
of the West India islands. It is a be
bird. 35. *A. strepera*, or gad-wal,
wings variegated with black, whi
red. It is found in England in
36. *A. tadorna*, or sheldrake, has a
ish black head, and the body is var
with white. It breeds in deserted
holes and lays fifteen or sixteen eg
A. tetrax, or campestris, is of t
of a pheasant and resembles the b
It runs swiftly and sits on the gro
the duck does in the water.

ANASARCA, in medicine, a kind o
sy, the skin appearing puffed up and
ing to the touch like dough.

ANASTATICA, the rose of Jeric
botany, a genus of tetradynamious
of the order siliculosa. The flowe
sists of four roundish petals, in the
a cross, and the fruit is a short bi
pod, having in each cell a single

wed. There are two species, annuals. Also a species of vorticella in the 5th order of vermes, infusoria. It is composed with bell-shaped flowers; and is the second species of clustering polypi of Trembley.

ANASTOMASIS, or ANASTOMOSIS, in anatomy, the opening of the mouths of vessels to discharge the fluids contained in them: also the communication of two vessels at their extremities.

ANASTOMATICS, medicines having the power of opening the mouths of vessels and promoting the circulation of the blood.

ANASTROPHE, in grammar and rhetoric, the inversion of the natural order of words, as *Saxa per et scopulos*, for *Per saxa et scopulos*.

ANATHEMA, an ecclesiastical term for the setting apart or devoting a thing; but it usually denotes the cutting off any person from religious communion. Among the heathens, anathema was an offering presented to a deity.

ANATINUS, a kind of shell found in the Indian ocean; also a species of the mytilus, common in our rivers, and called the duck, or small horse muscle.

ANATIS, a small pediculous insect, which infests the wild duck.

ANATOMY is the science which teaches the conformation of the human body, the solids and fluids of which are its particular objects.

The *solids* consist of

1. Bones which give support to the other parts. 2. Cartilages which are softer than bones, flexible and elastic. 3. Ligaments, white pliable substances which connect the ends of the bones to each other. 4. Membranes, a pliable network of fibres, interwoven together in the same plane. The planes are of different thickness, and are called laminæ. 5. Cellular substances are formed of membranes interwoven with each other. 6. Muscles are bundles of red fibres of various lengths, soft and contractile. 7. Tendons generally form the hard and inelastic terminations of muscles. 8. Viscera, portions of the body loosely contained in great cavities. 9. Glands which separate various fluids from the blood. 10. Vessels are membranous canals which branch in various directions, and transmit blood and other fluids. 11. Adipose substances are oil contained in the cells of the cellular membrane. 12. The nerves are bundles of white cords joined at one end to the brain or spinal marrow, from whence they extend over the whole body.

The *fluids* are

1 Blood which circulates through the vessels. 2. Perspirable matter, excreted by the vessels of the skin. 3. Sebaceous matter excreted by the glands of the skin. 4. Urine, by the kidneys. 5. Ceruminous matter, secreted by the ceruminous glands of the ear. 6. Tears by the lachrymal glands. 7. Saliva by the salival glands. 8. Mucus by the mucous glands of the mouth, &c. 9. Pancreatic juice by the pancreas. 10. Bile, by the liver. 11. Gastric juice, by the stomach. 12. Fat, by the vessels of the adipose membrane. 13. Synovia, by the *synovial* glands of the *joints*. *14. Seminal fluid by* the testes. 15. Milk, by the mammary glands.

Anatomy, from its particular subjects is divided into, 1. Osteogeny, or the doctrine of the growth of bones. 2. Osteology, or the doctrine of the matured bones. 3. Chondiology, which treats of cartilages. 4. Syndesmology, which treats of ligaments. 5. Myology, or the doctrine of muscles. 6. Bursalogy, which treats of the bursæ mucosæ. 7. Splanchnology on the doctrines of the viscera. 8. Angiology, which treats of the vessels. 9. Adenology of the glands. 10. Neurology or the doctrine of the nerves, &c.

Osteogeny begins in the flat bones of the head, in the form of radii diverging from a centre. In the middle of the cylindrical bones it takes place in the form of a flat ring, between the internal and external periostæum. In irregular bones it begins by a number of small points.

Osteology treats of full-grown bones. It has been generally held that the bones consist of fibres and lamellæ; but Scarpa has demonstrated that a cellular, reticular and vascular parenchyma forms the basis of the earthy matters, which give solidity to the bones, and therefore that their structure is the same as that of the soft parts of the body. The long cylindrical bones consist of two spongy epiphyses forming their termination, and of a diaphysis between the two epiphyses, of a compact structure, internally reticular, where the network supports the bags of the marrow. The broad or flat bones are very irregular. The periosteum of bones is the membrane which covers them. The marrow is an oil contained within the membranous bags, but its use is not exactly known. Numerous blood vessels pass into bones by small holes on their surface.

In the skull there are eight bones, viz. 1. The os frontis which forms the brow and the upper part of the orbits of the eyes. Externally it is convex, and the reverse internally, it has a serrated semicircular edge, which is turned upward, but the lower part is irregular. In children and sometimes in women, it is divided down the middle by a longitudinal suture. 2. The ossa parietalia form all the superior and some of the lateral parts of the skull. They are convex externally, concave internally, and of an irregular quadrangular form: the sides being anterior, posterior, superior, and inferior. 3. The os occipitis is placed in the lower and back part of the skull. In its form it is regularly rhomboidal. 4. The ossa temporum are placed at the lower part of the sides and base of the cranium, and are of an irregular figure. The upper part, or os squamosum, is outwardly smooth with a thin semicircular edge; the posterior part or pars mammillaris, is thicker and not so regular; and their inferior part which extends horizontally and becomes smaller, is called os petrosum, from its hardness. 5. The os sphenoides extends across the base of the skull from one temple to the other. 6. The os ethmoides is situated in the middle of the fore part of the basis of the *cranium*. It is pierced with *a number of holes* through which pass the *olfactory* nerves: from the middle arises a large process called crista galli; and opposite to it a thin one which partly divides the nose. These bones of the cranium are united by sutures, or serrated junctions, viz. the coronal, ascending over the fore-part of the skull; the lambdoidal, seated at its posterior part; the sagittal, joining these two in the middle of the upper part of the skull; the squamous placed on each side; and the spheroidal and ethmoidal surrounding the bones of those names.

The bones of the face are fourteen; of which the ossa nasi form the arch of the nose: the ossa lachrymalia are seated at the fore part of the inner edge of the orbits of the eyes: the ossa malarum constitute the prominences of the cheeks: the ossa maxillaria superiora, form the upper jaw and contain the sixteen upper teeth: the ossa palati are situated at the posterior part of the palate, nares and orbit: the ossa turbinata inferiora resemble those of the ethmoides: the vomer is a thin bone which completes the division of the nares: the maxilla inferiora is the bone of the lower jaw, containing the inferior sixteen teeth.

The teeth are formed of a bony substance and covered with an enamel. Each tooth consists of a head, a neck, and one or more fangs or roots sunk in the jaw. There are three classes, viz. four incisores, or the front teeth of each jaw: two cuspidati, on each side the former; four bicuspides behind the last; and six molares behind these. The last of the molares is termed dens sapientiæ. The os hyoides, or bone of the tongue, consists of a body, two cornua, and two appendices.

The spine consists of twenty-four true or moveable, and five immoveable vertebræ; named also the os sacrum, and of a small bone called the os coccygis. The true vertebræ consist of a body, a ring behind the body which transmits the spinal marrow, and of seven processes; four of which are articular, or connect the vertebræ together; and three for muscular attachment: two of which are called transverse from their lateral projection, and the other spinous, from its forming the spine of the back. The fine vertebræ are also divided into classes, as 1, the cervical, from their situation in the cervix or neck: of these are seven; 2, the dorsal, which are twelve, and connect with the ribs; 3, the lumbar, which are five and are connected with the lumbar regions or loins. The os sacrum is of the shape of a reversed pyramid. It forms the posterior part of the pelvis. The os coccygis resembles the last, to the lower part of which it is joined.

The pelvis, or inferior cavity of the trunk, consists of the os sacrum or coccygis, and two ossa innominata.

The thorax, or superior cavity of the trunk, is formed of the vertebræ, the sternum and twenty-four ribs, which are covered bones whose heads join the vertebræ. The upper seven are attached to the sternum and called true ribs; the inferior five are named false. The shoulder consists of two bones, the clavicula or collar bone, placed between the sternum or breast bone and the extremity of the shoulder; and the scapula a flat triangular bone, situated behind the upper part of the thorax.

The arm has one bone, named the os humeri, the head of which is inserted into the scapula, and the lower part terminates in two condyles. The fore arm consists of two bones, the radius and the ulna; the latter admits of flexion and extension, and serves as an axis to the radius which effects the movements of the hand.

The bones of the hand are divided into the carpus, metacarpus, fingers, and thumb. The carpus has eight small bones named schaphoides, lunare, cuneiforme and pisiforme forming the first row; the second row are called trapezium, trapezoides, magnum, and unciforme. The metacarpus has four bones whose bases attach to the carpus and the heads join the fingers. Each of the fingers and the thumb consists of three bones, articulating by cartilages with their fellows.

The bones of the lower extremities are those of the thigh, leg, and foot.

The thigh has only one, named os femoris, the upper part of which lets into a cavity of the os innominatum called acetabulum. At its base are two protuberances called trochanters.

The bones of the leg are three, viz. the patella a round bone, covering the knee: the tibia which has a triangular body and terminates below in the inner ankle or malleolus internus; and the fibula, a long triangular bone on the outside of the leg joined above to the tibia and terminating beneath at the outward ankle.

The bones of the foot are those of the tarsus, metatarsus, and toes. The first consists of seven bones; the metatarsus of five; and the toes three, except the great toe which has only two.

Chondrology. In the recent subject the articular surfaces of bones are covered by cartilage: and in some interarticular cartilages are placed as in the joint of the lower jaw, of the knee, &c.

Syndesmology. Capsular ligaments surround all the joints; but those which have the hinge-like motion, have lateral ligaments to keep them firm, while those which have motion in all directions, have ligaments internal to the capsular.

Bursalogy. The mucous bags called bursæ mucosæ, are situated wherever tendons pass over each other for the purpose of lubricating them.

Myology. Of the muscles of the integuments of the cranium.

These are 1. occipito frontalis, which rises from the transverse ridge of the os occipitis, and is inserted into the skin of the eye-brows. Its use is to pull the skin of the head backwards. 2. Corrugator supercilii, which arises from above the junction of the os frontis, os nasi, and os maxillare, and passes into the inner part of the occipito frontalis. Its use is to draw the eye-brows to each other.

Of the muscles of the external ear. These are, 1, the attolens aurem, which arises from the tendon of the occipito frontalis, and enters the upper part of the ear. 2. Anterior auris, which rises from the back part of the zygoma, and inserted behind the helix. 3. The retrapentes auris, arises from the root of the mastoid process and inserted into the convex part of the concha. 4. The helicis major, arises from the upper, anterior and acute part of the helix, and

he malleus. 2. The tensor
iom the extremity of the
e, and is inserted into the
f the handle of the malle-
edius rises from the pos-
: tympanum and inserted
or part of the head of the

'*the eyelids*, are, 1. orbicu-
im, which rises from the
bit, and inserted into the
f the maxillary bone. 2.
alpebræ superioris, rises
. of the orbit near the optic
iserted into the cartilage
lid.
' *eye-ball*. These are six,
id two oblique. The first
ottom of the orbit around
en, and are inserted at the
globe of the eye. Their
levator oculi, depressor
oculi, and abductor ocu-
e muscles are, 1. The obli-
or trochlearis, which ri-
ge of the optic foramen at
e orbit, and inserted into
otica between the attollens
:. 2. The obliquus inferior
outward edge of the orbitar
superior maxillary bone.
to the sclerotica, between
id optic nerve.
e nose. Its name is the
is, and it arises from the
nasi, and inserted into the
f the os maxillare and an-
y of the os nasi.
he mouth and lips. The
e pair of muscles inserted
id a common one formed
tion of these, viz. three
elow, and three outwards,
h surrounds the mouth.
e are, 1 The levator an-
l. rises from the superior

is formed by the muscles that move the lips and surrounds the whole mouth.

Muscles of the lower jaw. Of these there are four pair, two on the side of the face, and two concealed. 1. The temporalis, which arises from the parietal bone and the temporal fossa of the cranium, and is inserted into the coronoid process of the lower jaw. 2. The masseter arises from the inferior and inward part of the zygoma, and inserted into the outside of the angle of the lower jaw. 3. The pterygoideus internus, arises from the pterygoid fossa, and inserted into the inward part of the angle of the lower jaw. 4. The pterygoideus externus, arises from the external part of the outward pterygoid process, and is inserted into the front of the condyloid process.

The muscles of the anterior part of the neck are, 1. The musculus cutaneus vulgo platysma myoides, which arises from the cellular covering of the upper part of the deltoid and pectoral muscles, and inserted into the integuments which cover the side of the lower jaw. 2. The sterno-cleido mastoideus arises two ways, the anterior from the top of the sternum; and the posterior from the upper and anterior part of the clavicle, both inserted into the mastoid process.

The muscles between the lower jaw and os hyoides, consist of four layers before, and two muscles at the side. The former are, 1. The digastricus, arising from the fossa, at the root of the mastoid process of the temporal bone, and inserted into the lower part of the chin. 2. The mylohyoideus, arises from the inside of the lower jaw, and inserted into the base of the os hyoides. 3. The genio-hyoideus, arises from the inside of the middle of the lower jaw, and inserted into the basis of the os hyoides. 4. The genio-hyo-glossus, arises from the inside of the middle of the lower jaw, and inserted into the whole lage. 4. Thyreo-hyoideus rises opposite the preceding, and is inserted into the base and cornu of the os hyoideus. 5. The crico-thyroideus rises from the side and fore-part of the cricoid cartilage and is inserted into the lower part of the thyroid cartilage, and also into the inferior cornu.

Muscles between the lower jaw and os hyoides laterally. These are five: 1. The stylo-glossus, arising from the styloid process, and inserted into the tongue. 2. The stylo-hyoideus rises from the lower part of the styloid process and is inserted into the os hyoides. 3. The stylo-pharyngeus rises from the root of the styloid process and is inserted into the pharynx and thyroid cartilage. 4. The circumflexis or tensor palati, rising from the spinous process of the spheroid bone and spreading into a broad membrane, is inserted into the velum pendulum palati. 5. The levator palati rises from the pars petrosa of the temporal bone, and inserted into the velum pendulum palati.

The muscles about the entry to the fauces are, 1. The constrictor isthmi faucium, rising from the side of the tongue and inserted into the middle of the velum pendulum palati. 2. The palato-pharyngeus rises from the middle of the velum pendulum palati, and is inserted into the upper and back part of the thyroid cartilage. 3. The azygos uvulæ rises from the end of the suture joining the palate bones, and inserted into the tip of the uvula.

The muscles on the posterior part of the pharynx are, 1. The constrictor pharyngis inferior, which rises from the side of the thyroid and the ciracoid cartilage, and inserted into the middle of the pharynx. 2. The constrictor pharyngis medius arises from the appendix and cornua of the os hyoides, and is inserted into the middle of the cuneiform process of the os occipitis. 3. The constrictor pharyngis superior arises from the cuneiform process of the os occipitis, from the pterygoid process of the sphenoid bone, and the upper and under jaw. It is inserted into the middle of the pharynx.

Muscles about the glottis are four pair, and a single one. 1. The cryco-arytænoideus posticus, which rises in the posterior part of the cricoid cartilage and is inserted into the back part of the arytenoid cartilage. 2. The crico-arytænoideus lateralis, rises from the cricoid cartilage laterally, and inserted into the side of the base of the arytenoid cartilage. 3. The thyreo-arytænoideus rises from the under and back part of the middle of the thyroid cartilage, and inserted into the arytenoid cartilage above the crico-arytænoideus lateralis. 4. The arytænoideus obliquus rises from the base of one arytenoid cartilage, and inserted near the end of the other. The single muscle the arytænoideus transversus, rises from the side of one arytenoid cartilage, and inserted into the other.

Muscles in the fore part of the abdomen. There are three layers on each side, also a long one and generally a short one on each side the white line. The layers are, 1. The obliquus descendens externus rising by eight heads from the same number of inferior ribs, and inserted into the whole length of the linea alba and the anterior extremity of the os ilium. 2. The obliquus ascendens internus arises from the spine of the ilium, the os sacrum, the three lower vertebræ and Poupart's ligament. It is inserted into the cartilago ensiformis and the cartilages of the seventh and of the false ribs. 3. The transversalis rises from the inner part of the cartilages of the seven lower ribs, the inward part of the os ilium, and the tendon of the external oblique muscle. It is inserted into the cartilago ensiformis, and the linea alba. The long muscle in the middle is the rectus abdominus arising from the symphysis pubis and inserted into the cartilages of the three lower ribs. The short muscle in the middle is the pyramidalis rising with the rectus and inserted between the os pubis and umbilica in the linea alba.

The muscles about the male organs of generation. Each of the testes has one muscle. The cremaster rises from the lower part of the internal oblique and is inserted into the tunica vaginalis. The penis has three pairs. 1. The erector penis rises from the tuberosity of the ischium, and inserted into the membranous covering of the corpora cavernosa penis. 2. The accelerator urinæ or ejaculator seminis, rises from the sphincter ani, the membranous part of the urethra and the crus penis and inserted into the middle of the bulb. 3. Transversus perinei, rises from the membrane which covers the tuberosity of the ischium and inserted into the accelerator urinæ. Sometimes there is a fourth muscle called transversus perinei alter, rising behind the above, and inserted into the fore part of the accelerator urinæ.

Muscles of the anus. These are a single one, and a pair. The former is the sphincter ani, rising from the verge of the anus and inserted before into the perineum, acceleratores urinæ, and transversi perinei, behind into the extremity of the os coccygis. The levator ani rises within the pelvis, and is inserted into the sphincter ani, &c.

Muscles of the female organs of generation. The clitoris has one pair. The erector clitorides rises internally from the crus of the ischium, and is inserted into the clitoris. The transversus perinei, sphincter ani, and levator ani, are the same as those in the male.

Muscles within the pelvis. Of these there are two pair: 1. Obturator internus, which rises from the circumference of the thyroid foramen, and inserted into the top of the trochanter major. 2. The coccygeus arises from the spinous process of the ischium, and inserted into the end of the sacrum and the os coccygis.

The muscles within the cavity of the abdomen consist of a single one and four pair. The first is the diaphragm, a broad thin muscle forming a septum between the thorax and abdomen. It is divided into two parts: 1. The superior or greater muscle arises from the cartilago ensiformis, the cartilages of the seventh and all the inferior ribs, and inserted into a tendon in the middle of the septum. 2. The inferior or lesser muscle of the diaphragm rises by eight heads from the second, third, and fourth lumbar vertebræ; the two in the middle.

The four pair are, 1. The quadratus lumborum which rises from the posterior part of the spine of the ilium and inserted into the transverse processes of the lumbar vertebræ into the last rib and the last dorsal vertebræ. 2. Psoas parvus which com-

lage. 4. Thyreo-hyoideus rises opposite the preceding, and is inserted into the base and cornu of the os hyoideus. 5. The crico-thyroideus rises from the side and forepart of the cricoid cartilage and is inserted into the lower part of the thyroid cartilage, and also into the inferior cornu.

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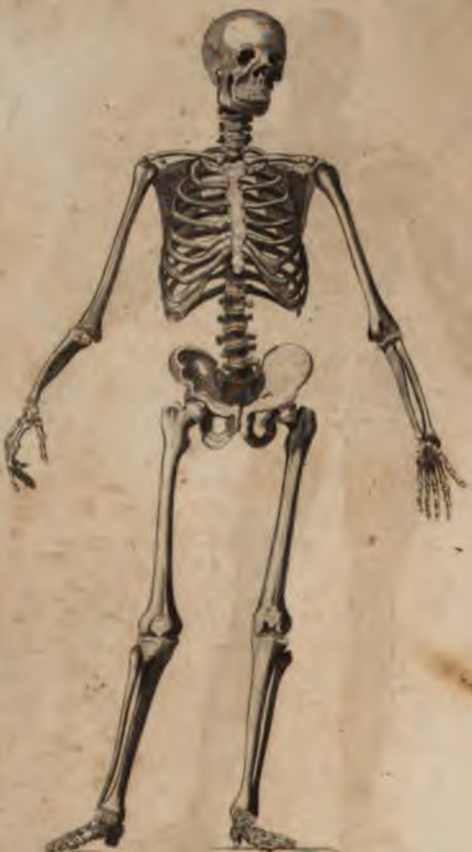
ANATOMY.

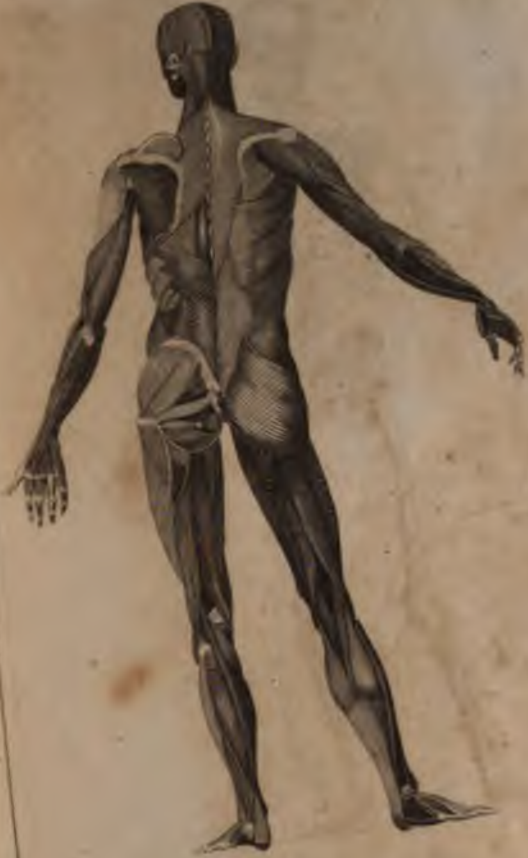
Plate I.



Cooper sculp.

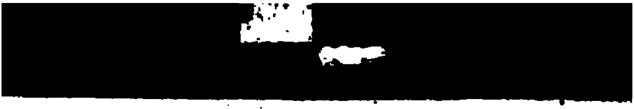
Published June 1, 1810, by R. Phillips, Bridge Street, Blackfriars, London.

ANATOMY. *Plate II.*



Cooper sculp.

Published Sept 1. [illegible] by R. Phillips. Bridge Street, Blackfriars, London.



um, and half the anterior
icle. It is inserted into the
biceps. The second layer
e muscles. 1. The subcla-
the cartilage of the first rib
nto the inferior part of the
he pectoralis minor rising
, fourth and fifth ribs, and in-
ne coracoid process of the
he serratus magnus which
nine upper ribs, and in-
base of the scapula.
between the ribs are, the ex-
rnal intercostals, which arise
r edge of one rib and are in-
upper edge of another.
orax is one pair of muscles,
s or sterno costalis rises from
ensiformis and the edge of
ne of the sternum. It is
the lower edge of the carti-
rd, fourth and fifth ribs.
in the front of the neck close
, consist of one layer formed
s. 1. The longus colli rising
superior laterally, and the
esses of the third, fourth, fifth
ncel. It is inserted into the
le vertebræ of the neck. 2.
apitis internus major rises
verse processes of the third.
and sixth cervical vertebræ.
into the cuneiform process
itis. 3. Rectus capitis inter-
es from the body of the atlas,
into the condyloid process
pitis. 4. The rectus capitis
from the transverse process
nd inserted into the os occipi-
the foramen magnum.
of the neck. 1. Scalenus
calenus medius, and 3. Sca-
s.
on the back of the trunk, are,
nus, which rises from the os

inferior of the neck and joins the ligamentum nuchæ. It is inserted into the five superior transverse processes of the cervical vertebræ, the back of the mastoid process and the os occipitis. 2. The complexus, which rises from the transverse processes of the seven superior vertebræ of the back, and four inferior of the neck, and inserted into the os occipitis. 3. The trachelo-mastoideus, rises from the transverse processes of the three upper dorsal, and five lower cervical vertebræ. It is inserted into the back of the mastoid process. 4. The transversalis colli, rises from the transverse processes of the five upper vertebræ of the back, and inserted into the transverse processes of the cervical vertebræ, except the first and last. 5. The rectus capitis posticus major, rises from the spinous process of the dentata, and inserted into the os occipitis. 6. The rectus capitis posticus minor, rises from the back of the atlas, and inserted behind the great foramen. 7. The obliquus capitis superior, rises from the transverse process of the atlas, and inserted into the os occipitis, behind the back of the mastoid process 8. The obliquus capitis inferior, rises from the spinous process of the dentata, and inserted into the transverse process of the atlas. On the back near the spine are, 1. The sacro-lumbalis, which rises with the longissimus dorsi, and is inserted into the curve of the ribs. 2. The longissimus dorsi, rises from the side and the spines of the sacrum; the posterior spine of the ileum, from the spines and the transverse processes of the lumbar vertebræ It is inserted into the transverse processes of the dorsal vertebræ, and the lower edge of the ribs except the two inferior. 3. The spinalis dorsi, rises from the spines of the two upper lumbar vertebræ, and the three inferior dorsal vertebræ. It is inserted into the spines of the nine upper dorof the lumbar, dorsal, and cervical vertebræ, except the first. 1. The interspinales colli, rise from the spine of the inferior vertebræ of the neck, and are inserted into the spine of the superior vertebræ. 2. The intertransversales colli, rise from the inferior transverse process of each vertebræ of the neck and first of the back, and inserted into the superior transverse processes. 3, 4, 5. The interspinales dorsi and lumborum, and the intertransversales dorsi, are rather tendons than muscles. 6. The intertransversales lumborum, are four small bundles that occupy the spaces between the transverse processes of the lumbar vertebræ.

The muscles on the shoulder are, 1. Deltoides, which rises from the clavicle, processus, acromion and spine of the scapula, and inserted into the anterior and middle os humeri. 2. Supraspinatus, rises from the base, spine, and upper costa of the scapula, and inserted into a tuberosity at the head of the os humeri. 3. Infraspinatus, rises from the base and spine of the scapula, and inserted into the upper part of the tuberosity. 4. Teres minor, which rises from the inferior costa of the scapula, and inserted into the lower part of the tuberosity. 5. Teres major, rises from the inferior angle and costa of the scapula, and inserted into the head of the os humeri. 6. Coraco-brachialis, rises from the coracoid process of the scapula, and inserted within the os humeri.

The muscles on the arm are, 1. Biceps flexor cubiti, which rises from the coracoid process, and the glenoid cavity of the scapula. It is inserted into the tuberosity of the os humeri. 2. Brachialis internus rises from the os humeri, below the tendon of the deltoides, and inserted into the coronoid process of the ulna and the olecranon. 3. Triceps extensor cubiti, rises from the inferior costa of the scapula; from the upper part of the os humeri; and also from the back of the same bone.

The muscles on the fore arm are, 1. Supinator longus, which rises above the outer condyle of the os humeri, and inserted into the radius. 2. Extensor carpi radialis longus, rises below the former, and is inserted into the upper part of the metacarpal bone of the middle finger. 3. Extensor carpi radialis brevis, rises from the outer condyle and the upper part of the radius, and is inserted into the back of all the bones of the fingers. 4. Extensor digitorum communis rises from the outer condyle of the os humeri, and inserted as the former. 5. Extensor minimi digiti, rises as the above, and inserted into the bones of the little finger. 6. Extensor carpi ulnaris, rises from the condyle of the os humeri, and is inserted into the metacarpal bone of the little finger. 7. Anconeus, rises the same, and is inserted into the outer edge of the ulna. 8. Flexor carpi ulnaris, rises from the inner condyle and the upper edge of the olecranon. It is inserted into the os pyriforme. 9. Palmaris longus, rises from the inner condyle of the os humeri, and inserted into the internal annular ligament. 10. Flexor carpi *radialis*, rises from the inner condyle of *the os humeri*, and is inserted into the *metacarpal bone* of the forefinger. 11. Pronator radii brevis, rises from the inner condyle of the os humeri and coronoid process of the ulna. It is inserted into the radius near the middle. 12. Flexor sublimus perforatus, rises from the inner condyle of the os humeri, the coronoid process of the ulna and the radius. It is inserted into the second bone of each finger. 13. Supinator radii brevis, rises from the outer condyle of the os humeri, and the ulna, and is inserted into the radius. 14. Abductor pollicis longus, rises from the ulna interosseous ligament and radius; and inserted into the os trapezium and first bone of the thumb. 15. Extensor minor pollicis, rises as the last, and is inserted into the second bone of the thumb. 16. Extensor major pollicis, rises from the ulna interosseous ligament, and is inserted into the third and last bone of the thumb. 17. Indicator, rises from the ulna, and inserted into the metacarpal bone of the fore finger. 18. Flexor profundus perforans, rises from the ulna and interosseous ligament, and is inserted into the fore part of the last bone of each finger. 19. Flexor longus pollicis, rises from the radius, and inserted into the last joint of the thumb. 20. Pronator radii quadratus, rises from the ulna, and inserted into the radius.

Muscles on the hand. 1. Lumbricales rise from the tendons of the perforans and inserted into the extensor digitorum communis. 2. Abductor brevis pollicis rises from the fore part of the internal annular ligament, os scaphoides, and one of the tendons of the abductor longus pollicis: and is inserted outside the second bone of the thumb. 3. Opponens pollicis, rises from the inner and anterior part of the internal annular ligament and the os scaphoides. It is inserted into the first bone of the thumb. 4. Flexor brevis pollicis, rises from the os trapezoides, internal annular ligament, os magnum, and os unciforme, and inserted into the ossa sesamoidea and second bone of the thumb. 5. Abductor pollicis, rises from the metacarpal bone of the middle finger, and inserted into the base of the second bone of the thumb. 6. Abductor indicis, rises from the inner side of the first bone of the thumb and the os trapezium; and is inserted into the first bone of the fore finger. 7. Palmaris brevis, rises from the internal annular ligament and aponeurosis palmaris, and inserted into the os pisiforme and the skin of the abductor minimi digiti. 8. Abductor minimi digiti, rises from the internal annular ligament and os pisiforme; and inserted into the side of the first bone of the little finger. 9. Flexor parvus minimi digiti, rises from the os unciforme and internal annular ligament; and inserted into the first bone of the little finger. 10. Abductor metacarpi minimi digiti, rises from the os unciforme and internal annular ligament. It is inserted into the metacarpal bone of the little finger. 11. Interossei interni, seated between the metacarpal bones; and inserted into the roots of the fingers. 12. Interossei externi, are situated between the metacarpal bones in the back of the hand, and inserted into the roots of the fingers.

Muscles on the upper part of *the*

aus, rises from the
posterior-sacro ischia-
crum, and os coccygis;
the upper part of the
e os femoris. 2. Glu-
from the spine and su-
the ilium: and inserted
d back part of the tro-
teus minimus, from the
the ilium, and inserted
and anterior part of the
. 4. Pyriformis, rises from
t of the os sacrum, and in-
oot of the great trochanter.
two portions, one from the
of the spine of the ischium,
from the tuberosity of the
osterior sacro-ischiatic liga-
erted as the pyriformis. 6.
ternus rises from the inside
en thyroideum, and inserted
7. Quadratus femoris, rises
berosity of the ischium, and
etween the two trochanters.
the thigh. 1. Biceps flexor cru-
origins, one from the tubero-
ischium, the other from the li-
, near the insertion of the glu-
imus. It is inserted into the up-
back part of the fibula. 2.
inosus, arises from the tubero-
e ischium, and inserted into the
d inner part of the tibia. 3. Se-
branosus, has the same origin, and
ed into the head of the tibia be-
. Tensor vaginæ femoris, arises
e superior and anterior spinous
of the ilium, and inserted within-
e fascia lata. 5. Sartorius, arises
law, and inserted into the upper
f the tibia within. 6. Rectus, ari-
two tendons, one from the anterior
nterior spinous process of the ilium,
other from the cotyloid cavity: in-
d into the rotula. 7. Gracilis, arises
the forepart of the ischium and pu-
inserted into the upper part of the
a within. 8. Vastus externus, rises
m the anterior and lower part of the
eat trochanter, and the external edge of
he linea aspera: inserted into the upper
nd outer part of the rotula. 9. Vastus
nternus, arises from the inner edge of the
linea aspera, and inserted into the outer
and inner part of the rotula. 10. Cruræ-
us, arises from the outer and anterior
part of the lesser trochanter: inserted in-
to the upper part of the rotula. 11. Pec-
tinalis, arises from the anterior edge
of the os pubis: inserted into the up-
per and fore part of the linea aspera.
12. Adductor longus femoris, arises from
the upper and fore part of the os pubis:
and inserted in the middle of the linea
aspera. 13. Adductor brevis femoris, ari-
ses from the fore part of the ramus of the
os pubis, and inserted into the inner and
upper part of the linea aspera. 14. Ad-
ductor magnus femoris, arises from the
lower and fore part of the ramus of the os
pubis, and inserted into the whole length
of the linea aspera. 15. Obturator exter-
nus, arises from the obturator ligament,
and the foramen thyroideum. It is insert-
ed into the os femoris.

Muscles on the leg. 1. Gastrocnemius externus has two originals; one from the inner condyle, the other from the outer condyle of the os femoris. 2. Gastrocnemius internus has also two origins, one from the back of the head of the fibula, the other from the upper and back part of the tibia. It is inserted by the tendo achilles, with the former muscle into the lower and back part of the os calcis. 3. Plantaris, arises from the upper and posterior part of the outer condyle of the os femoris, and inserted within the back part of the os calcis. 4. Popliteus, arises from the outer condyle of the thigh, and inserted into the upper part of the tibia, within. 5. Flexor longus digitorum pedis, arises from the upper and inner part of the tibia, and inserted into the last bone of the toes except the great one. 6. Flexor longus pollicis pedis, arises from the back part and just below the head of the fibula. It is inserted into the last bone of the great toe. 7. Tibialus posticus arises from the back part and outer edge of the tibia, and from the interosseous ligament and adjacent part of the fibula, and inserted into the inner and upper part of the os naviculare and the side of the os cuneiforme medium. 8. Peroneus longus arises from the outward side of the head of the tibia and from the upper anterior and outer part of the fibula. It is inserted into the metatarsal bone of the great toe. 9. Peroneus brevis, arises from the outer and forepart of the fibula, and inserted into the metatarsal bone of the little toe. 10. Extensor longus digitorum pedis, arises from the upper, outer and forepart of the tibia, interosseous ligament, and inner edge of the fibula: and inserted into the first joint of the small toes. 11. Peroneus tertius from the lower part of the fibula before and the interosseous ligament. It is inserted into the metatarsal bone of the little toe. 12. Tibialis anticus, arises from the upper and forepart of the tibia, and inserted into the os cuneiforme internum. 13. Extensor proprius pollicis pedis, arises from the upper and forepart of the tibia and inserted into the surface of the bones of the great toe.

Muscles on the foot. 1. Extensor bre-
vis digitorum pedis, arises from the upper
and anterior part of the os calcis, and in-
serted by four tendons: one joins the ten-
don of the externus longus pollicis and the
others the tendons of the exterior digito-
rum longus. 2. Flexor brevis digitorum
pedis, arises from the lower part of the o
calcis, and inserted by four tendons into th
second phalanx of the small toes. 3. A
ductor pollicis pedis, arises from the
ner and lower part of the os calcis, and
serted into the first joint of the great t
4. Abductor minimi digiti, arises fr
the outer tubercle of the os calcis, the
of the metatarsal bone of the little
and from the aponeurosis plantaris.
inserted into the first joint of the little
5. Lumbricalis pedis, arises from
tendons of the flexor longus digitoru
dis, and inserted into the tendinous e
sion at the parting of the toes. 6.
or brevis pollicis pedis, arises fro
inferior and anterior part of the os
and the inferior part of the cuneifor
ternum: inserted by two tendons i
first joint of the great toe. 7.
tor pollicis pedis, arises from the
the metatarsal bones of the 2d,

4th toes: inserted into the first joint of the great toe. 8 Transversalis pedis, arises from the outer and under part of the anterior extremity of the metatarsal bone of the little toe, and inserted into the metatarsal bone of the great toe. 9. Flexor brevis minimi digiti pedis, arises from the base of the metatarsal bone of the little toe and inserted into the first joint of the same. 10. Interossei pedis interni and externi, between the metatarsal bones.

Splanchnology, explains the doctrine of the viscera; which are divided into thoracic. abdominal, and pelvic.

The contents of the thorax will be described in another place.

The salival glands, which also belong to this head, are the parotid, maxillary, sublingual, thyroid, molar, buccal, labial, lingual, amygdaline, palatine, uvular, arytenoid, &c. and the names of them explain their situations. The abdomen is divided into the epigastric, hypochondriac, umbilical, epicholic. hypogastric, and inguinal regions. It contains the peritoneum, the stomach, the intestines, liver and gall-bladder, spleen and pancreas, kidneys, ureters, &c. The productions of the peritoneum are the great and small omentum, and mesentery, which support and convey the vessels to the intestines. The stomach consists of a great and small curvature, a great and small extremity, and two orifices named cardiac and pylorus. The small intestines are the duodenum, the jejunum, and the ilium. The great intestines consist of the cœcum with its appendix, and has upon it the beginning of three ligamentary bands of the colon, externally appendices epiploicæ, and internally valvulæ conniventes, forming the cells of the colon and the great valve of the colon, and of the rectum terminating in the anus.—The liver consists of three lobes, two great and a small one; with a middle, right, left, and round ligament; internally it is formed of the penecelli, or terminations of the venæ portæ, the pori biliarii, wherein the bile is secreted, and the hepatic ducts which carry the bile from the liver. The gall-bladder consists of a fundus, a body and a neck which terminates in the ductus cysticus, and this with the hepatic forms the ductus communis choledochus. The structure or use of the spleen is hardly understood.

The pancreas resembles the salivary glands, and has a duct which with the ductus communis choledochus, terminates in the duodenum. The kidneys are seated behind the peritoneum; the internal cavity, called the pelvis, opens into the ureter.—The pelvic viscera consist of the urinary bladder, and the organs of generation. The bladder consists of a bottom, a body and a neck, and the coats are a muscular, a cellular and a villous. The male organs of generation consist of the testes, having three coats, the tunica vaginalis, the cremaster, and the tunica albuginea; the prostate gland is between the neck of the bladder and the bulb of the urethra: the projection on its inner surface is termed caruncula. The penis consists of the corpora cavernosa on each side, the urethra inferiorly, the corpus spongiosum which surrounds the former, the glans penis terminating the corpus spongiosun
teguments and præputium.—
organs of generation consist ext
pubis or mons veneris, the lab
formed of two crura and a bod
phæ internal to the labia, the
the vagina, which in virgins
hymen or circulus membrar
mains of this afterwards assum
of carunculæ myrtiformes.
organs are the uterus, which
neck, a body, and a fundus,
angular cavity; the inferior
called os tincæ. The ligamer
nect the uterus with the sides
vis. The ovaria are attache
ners, and the fallopian tubes p
the fundus to the sides of the

Angiology, or the doctrine
of the body, is divided into
the first treats of the absorbe
cond of the arteries, and the
veins.

1. *The absorbent system* cor
lacteals, the lymphatic vesse
mon trunk, the thoracic duct,
globate glands.

The lacteals begin from th
tube, and can generally be se
quadrupeds that have been ki
three hours after eating,
appear filled with a white c
lymphatic vessels are small pe
in most parts of the body, cont
rally a colourless fluid whenc
the name of vasa lymphatica.
teals, and most of the lymp
into the thoracic duct, which li
spine and runs towards the nec
opens generally into the ang
the internal jugular and subcl
of the left side, by which mear
and lymph are mixed with the
lacteals, lymphatics, and th
have their coats much thinner
of the blood-vessels; but thei
of much greater strength. T
lymphatic vessels have arterie
for their nourishment. In m
particularly in man and the
the lymphatic system is full
whence the lymphatics have
times termed valvular lymph
These valves are usually two
nar shape, and one larger than
In some parts there are three
in the space of an inch; but
there are several inches witho
There are fewer in the thoraci
in other parts. When the vess
tended with lymph they appe
that side of the valves next t
that a lymphatic vessel some
like a chain of vesicles. The
system has the glands called co
lymphatic; which are placed
vessels come in on one side an
another in their passage to
duct. They are of various siz
fer in colour according to the
and age. The absorbent syst
the glands is divided into the
lymphatic vessels, the lacteal s
lymphatic duct. The first be
intestinal tube, the second to
parts of the body, and the lact
thoracic duct is the common
lacteals and lymphatics.

m, the other sides adhering
diaphragm. The particular
the two pleuræ is named
m, and the two laminæ com
near the sternum and verte-
middle and foreside they
y the pericardium and heart.
they are parted by the oe-
in the most poster.or part a
ich is occupied by the aorta:
n from the pericardium to
e two laminæ adhere closely,
mediastinum is transparent,
the thymus gland is seated.
is divided into two cavi-
from each other by a mid-
ithout any communication,
quity of this partition the
larger than the left, though
ptions to this description.
nnected to the membran-
of the sternum, ribs and
e diaphragm, pericardium,
and vessels: and to all that
nvex side. The pleura is
ument to the cavity of the
mediastinum prevents one
ing on the other, and forms
the heart, pericardium, oe-

um, is a membranous cap-
l figure, containing the heart
dages. It is composed of
he middle one consisting of
filaments, closely interwo-
other. The internal lami-
a continuation of the outer
rt, auricles and great ves-
ks of the aorta and pulmo-
re contained in a common
ed by a cellular substance.
m is connected to the dia-
place answering to the flat

like them named right and left. From the par vagum and intercostals the heart is supplied with nerves. The arteries rise from the aorta, and are called coronary arteries. From these the blood is returned into the auricles by the coronary veins. When the heart contracts it drives the blood from the ventricles into the arteries, and the arteries being then distended naturally contract as soon as the heart dilates and ceases to supply them with blood. These alternate motions of contraction and dilatation are called *systole*. When the heart is contracted the arteries are distended with blood in their diastole; in which state we feel the motion called the pulse.

The lungs are two spongy bodies of a reddish colour in children, greyish in adults, and blueish in old persons, one is seated on the right side and the other on the left of the thorax, and parted by the mediastinum and heart. The right lung which is larger than the left has three lobes or two and a half; and the left two lobes. The lungs are made up of an infinite number of membranous cells and of different kinds of vessels spread among the cells in various directions. This mass is covered by a membrane continued from each pleura. The principal of the vessels are air vessels and blood vessels; the former of which are called bronchia. These are conical tubes connected by a ligamentary elastic membrane, and so placed as to insinuate into each other. The bronchia are divided into numerous ramifications which lessen in size and change from being cartilaginous to membranous. Each of these tubes is widened at the extremity and formed into a cell called a vesicle. These cells are connected together in bundles called lobules, and as the great branches are divided into small rami, so the right auricle. The ramifications of the arteries are larger and more numerous than those of the veins.

Besides the capital blood vessels there are others called bronchial arteries and veins which are very small and follow the bronchia. They communicate with the pulmonary arteries and veins, also with those of the oesophagus and with branches of the coronary artery and vein. Under the root of each lung there is a broad ligament which unites it to the lateral parts of the vertebræ of the back. The trachea or aspera arteria is a large canal, partly cartilaginous and partly membranous, running from the lower part of the neck into the thorax between the two pleuræ, and having reached the curvature of the aorta enters the lungs in two branches called the bronchia, which have been already described.

Of the Arteries. These are long elastic and pulsating tubes of various diameters. They have three coats; an external or cellular, a middle or muscular, and an internal or smooth membranous coat. The use of the arteries is to convey blood from the heart through the lungs all over the system and the heart itself.

The aorta or great artery, arises from the left ventricle of the heart and sends out branches to all parts of the body. The first part of this vessel called the ascending aorta passes over the left pulmonary artery and veins, and branch of the trachea. It is then reflected under the left lobe of the lungs and obtains the name of the descending aorta, by which name it is distinguished through the thorax and abdomen when it passes on the left side of the spine, till it divides into iliac arteries between the third and fourth vertebræ of the loins. 2. The two coronary arteries of the heart arise from beneath the semilunar valves, and in returning to the heart form an acute angle with the rising trunk. From the curved part of the aorta arise the subclavian and carotid arteries; the right subclavian and carotid in one trunk but the left single. 3. The carotid arteries run on each side the larynx to the sixth foramen of the skull, where they enter and proceed to the brain; but in their passage they detach many branches, called by the names of the parts they are sent to, as laryngeæ, thyroidæ, linguales, temporales, &c. Each of them also sends a small branch through the fifth foramen to that part of the dura mater containing the cerebrum. The internal carotids send two branches to the back part of the nose, and several others through the first and second foramen of the skull to the face and parts within the orbits of the eyes, and after piercing the dura mater divide each into two branches, one passing between the two hemispheres of the brain, and the other between the anterior and posterior lobes. These branches take many directions and divide into very small branches in the pia mater, before they enter the brain. 4. The brain has two other arteries called cervicales, which arise from the subclavian arteries and ascend to the head, through the *foramina.* These two arteries send *branches to the cerebellum* after which
they divide and communicate w
rotids. 5. The subclavian a
each continued to the cubit in
called axillaris as it passes the a
humeralis as it passes by the
From the subclavians within
arise the arteræ mammariæ
on the inside of the sternum.
humeralis near the joint of
divides into two branches call
superior and inferior; and the
sends off another called cu
dia. The two first give
the hands and fingers; and
bestowed on the muscles ab
bow. 6. From each side the
aorta a branch is sent under eve
ed intercostalis, and about the f
bra of the back it sends two b
the lungs called bronchiales.
passes under the diaphragm i
ther two branches called arteri
Below the diaphragm arises th
tery from the aorta. This divi
veral branches which pass to
pancreas, liver, stomach, and
and are named from the par
bestowed on, except two called
rior and inferior coronary, and
on the duodenum which is m
tinalis. Just below the cæliac
the aorta arises the mesenteric
whose branches are distributed
intestinum jejunum and ilium,
colon, and sometimes upon the
tle below this arise the emulge
arteries of the kidneys; and b
anterior to the aorta, arise the
arteries, which are distributed
nitals in men. Laterally and to
the aorta sends branches to the
lumbales; and one forward, t
and rectum called the inferior
Between the cæliac, and two
arteries and the branches of the
intestines are large branches
the blood from one to another
are compressed. 7. When th
vides on the loins it sends an
the pelvis upon the os sacrum
teria sacra, and the branches
the aorta divides are nam
These are the internal and ext
first send off the umbilical art
are obliterated in adult per
other branches are bestowed o
muscles and upper part of
The iliacæ externæ run over th
bis into the thighs, and in pas
the abdomen they send off th
called epigastricæ to the integ
der the recti muscles. The ep
teries send each a branch into
and through the foramina of th
minata to the muscles in that p
the iliac artery has passed out
domen into the groin it is call
lis and in the thigh cru alis
sends a branch to the back
thigh; but the main trunk pass
the flexors and extensors of the
passing through the insertion
ceps muscle into the ham is t
poplitea. It divides into two
one called tibialis antica, which
tween the tibia and fibula dow
part of the leg, and bestowed

they have no pulsation,
divided, have a greater
teries, possess more nu-
s, a more reticular ar-
run more superficially.
of the viscera and brain,
so possess valves. The
nal part of the head and
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l, occipital, and muscu-
nate in the external ju-
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nuses of the brain are,
cular, petrosal, occipital,
erior and inferior, torcu-
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ular. The vertebral veins
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jor, which passes up the
nd thigh, and terminates
vena saphena minor,
side of the leg, and ter-
am; the popliteal and
pany their correspond-

cornea; these make one case for the attachment of the other coats of the eye, and to hold the humours. The fore part of this coat being transparent and like a horn, is called cornea, and the rest sclerotis. Under the cornea is the iris, an opake membrane, of different colours in different persons. The pupil is a round perforation in the middle of the iris, and through this the rays of light are admitted. 5. Under the sclerotis is another membrane called choroides, having a number of vessels. 6. Next to this lies the tunica retina, which is the optic nerve expanded and extended with the choroides. Rays of light striking upon this membrane, the sensation is conveyed by the optic nerves to the common sensorium. These nerves do not enter at the middle of the bottom of the eyes, but nearer the nose; that the same object may be perceived by both eyes. 7. Between the tunica choroides and retina, there is a black powder, called nigrum pigmentum; the use of which, is to absorb the rays of light as they pass through the network of the retina to render vision more exact. 8. Within the eye, and under the iris, are several small fibres called ciliary processes serving, as is thought, to contract and dilate the pupil. 9. The inside of the eye is filled with three humours, the aqueous, the crystalline, and vitreous. The first is contained in a space formed in the interstices of the anterior portion of the coats. The vitreous is a particular membranous capsula. The crystalline is so named from its resemblance to crystal. It is of a lenticular form, and contained in a fine membrane, called capsula crystallina.

The humours of the eye with the cornea, refract and converge the rays of light to membrane containing some hair. The cerumen or wax secreted by these glands defends the part from the air and insects. At the extremity of the meatus auditorius lies the membrana tympani, extended upon a bony ridge nearly horizontal. This membrane has on one side a small aperture covered with a valve. Into the middle of the tympanum is extended a small bone called malleus, the other end of which is articulated to a bone, named incus, and this again is articulated by the intermission of a smaller bone called orbiculare, to a fourth named stapes. These are contained in the cavity behind the tympanum called the barrel of the ear. The malleus being moved by the musculus obliquus internus or trochlearius, extends the tympanum, that it may be more sensibly affected by the impulse of sounds. This muscle rises from the cartilaginous part of the Eustachian tube, and is inserted into the handle of the malleus. Parallel to it lies another extensor of the tympanum, called obliquus externus, which rises from the outer and upper part of the Eustachian tube, and passing through the same hole with the corda tympani, is inserted into a long process of the malleus. The relaxation of the tympanum, is made by this muscle when sounds are too strong. From the cavity behind the tympanum goes the Eustachian tube, which ends cartilaginously behind the palate. The use of this passage appears to be to let the air pass in and out from the barrel of the ear to make the membrane vibrate the better. To the stapes there belongs a muscle called musculus stapedis, which serves to pull the stapes off the hole, called fenestra ovalis. There is another hole called rotunda. These two lead to a cavity named vestibulum, which opens into others called cochlea, and three canals named the labyrinth, in which are spread the auditory nerves that communicate the impulse of sounds to the brain: and it is probable that the cordea tympani, a branch of the fifth pair of nerves, answer the same purpose. The fenestra ovalis and rotunda, are closed with a fine membrane by which sounds are modulated.

Of the nose and sense of smelling. The firm or hard parts of the nose are mostly bony and the rest cartilaginous; the soft parts are the integuments, muscles, lacrymal bag which receives the tears, the membrana pituaria, vessels, nerves and hairs. The sense of smelling is performed by means of the membrane which covers the internal cavity of the nostrils. To defend this part from the air, it is supplied with a mucus, which is at first fluid, but afterwards becomes more consistent. The air filled with the subtle effluvia of bodies, is by respiration urged through the nose and applied to the soft olfactory nerves, in which that feeling is excited called smelling.

Of the mouth and organ of taste. The bony parts of the mouth, are the ossa maxillaria, ossa palati, maxilla inferior, and the teeth; to which may be added the os hyoides and upper vertebræ of the neck. The external parts of the mouth need no description. The internal are the gums, the palate, septum palati, uvula, amygdalæ, the tongue, the membrane which lines the cavity, the salival duct and glands and the bottom of the mouth. The palate is that arch of the mouth surrounded anteriorly by the alveolar edge and teeth of the upper jaw, and reaching thence to the great opening of the pharynx. This arch is partly solid and fixed, and partly soft and moveable. The tongue is the chief organ of taste; though this sense is not confined exclusively to that member, for to whatever part of the mouth some bodies are applied the sensation of taste will be perceived. The papillæ of the tongue perform the office of touch more exquisitely than the cutaneous papillæ; and are affected in a particular manner by salts, &c.

Of the skin and organ of touch. The outside of the skin is covered by a thin pellicle called epidermis, cuticular or scarf skin. Under the cuticle, is a substance called corpus cuticulare or rete mucosum. In negroes this substance is of a black colour, but in Europeans white, brown, or yellowish. The cutis vera, or the skin, is a substance made up of fibres closely connected with each other, and running in various directions, being composed of the extremities of numerous vessels and nerves. In different parts of the body are small oval glands or follicles, seated chiefly under the skin in the corpus adiposum; these are called sebaceous and miliary. The last universal integument, is the membrana adiposa, or corpus adiposum. The nails and hair belong to the common integuments. The papillæ of the fingers or inside of the hand, may become erect or elevated, and being gently pressed against a tangible body, receive an impression which is conveyed to the brain, and is called touch. But the most important office of the skin, is to exhale moisture from the body, and to absorb vapours from the atmosphere, for which purpose it is replete with small arteries that afford a passage to the insensible perspiration, and lest it should be accumulated between the skin and cuticle, there are pores in the latter corresponding with the exhaling arteries.

Of the brain. This mass is divided into the cerebrum or brain, properly so called, the cerebellum, and medulla oblongata: to which is added, the medulla spinalis, being a continuation of the latter. There are two membranes of the brain, called meninges; that which lies next the cranium is called dura mater, and the other which touches the brain, the pia mater.

The *cerebrum* is a medullary mass of a greyish colour, filling the whole inferior portion of the cavity of the cranium. It is divided into two lateral portions separated by the falx or longitudinal septum of the dura mater. These are termed hemispheres: and each is divided into two extremities, termed the lobes of the cerebrum, having between them a large inferior protuberance called also a lobe. Each lateral portion of the cerebrum has three sides, through the whole surface are inequalities or circumvolutions into which are insinuated the septa or duplicatures of the pia mater. The substance of the cerebrum is of two kinds, one of an ash colour, and the other very white. The former lies chiefly on the outer part like a cortex, whence it is called substantia cordicalis or cinerea.

[illegible]
. Beyond these are two
nates, and under them
testes. Above the nates
inealis, which in the opi-
es is the seat of the soul.
nervorum opticorum are
s, glands, and lymphatics,
oroides. Under the be-
ornix is a small hole cal-
ndibulum: and under the
rnix another called fora-
having a valve named
lvula major. The space
mina and the cerebellum
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the second process of the
dividing this part longi-
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y of which is called cala-
. Here are two medul-
d pedunculi, which are
cerebellum.
oblongata, is a medullary
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ebellum.
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oblongata through the
the skull and through the
spine whence it has its

From the medullary part
, ce ebellum, and medul-
e a vast number of small
ich unite as they proceed
cords, called nerves. The
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unk from which they are
he nerves separate they

[illegible] are called motores oculi. The 4th pair originate in the anterior lateral part of the processus annularis, and go out at the foramina lucera, to be distributed on the musculi trochleares, or obliqui majores oculorum, these are called pathetica. The 5th pair arise from the sides of the annular process, and after piercing the dura mater divide into three branches, the ophthalmic, or maxillaris superior, and maxillaris inferior. The first runs through the foramen lucerum to the orbit, and is afterwards distributed to the ball of the eye with the third pair; also to the nose with the olfactory. This opthalmic branch is likewise distributed to the glandula lacrymalis, the fat, membranes, and palpebræ of the eye. The second branch or maxillaris superior, principally serves the parts of the upper jaw. The third or maxillaris inferior, serves the muscles of the lower jaw and those between the os hyoides and the jaw. It sends also a branch to the tongue and another to the teeth. The 6th pair of nerves rise from the fore part of the corpora pyramidalia, and after passing through the dura mater send off a branch, which with the opthalmia branch of the fifth pair, forms the beginning of the intercostal, and then passes through the foramen lacerum to be spent on the musculus abductor oculi. The 7th pair issues from the root of the annular process, and enters the meatus auditorius internus, where it divides into two parts, one expanded on the inward camera of the ear, and the other passing through the Fallopian aqueduct comes out on the skull. The first is called portio mollis, and the last dura. This supplies the neck and various other parts. The 8th pair, or par vagum originale, form the base of the corpora oblivaria, and at the aperture belonging to the ossa temporum and occipitis are joined by the accessores Willisii, with which they pass out at the com-are at last lost in the tongue. The 10th pair proceeds from the beginning of the medulla spinalis, and distributed on the musculi obliqui, and extensores capitis except what goes to the ganglion of the intercostal. The thirty pair of nerves proceeding from the medulla spinalis, are divided into four species, viz seven of the neck, twelve of the back, five of the loins, and six of the os sacrum. The first cervical goes out between the first and second vertebræ, and is spent on the musculus flexus colli, splenius, complexus, and teguments of the occiput. The second cervical communicates with the ninth, and with the first and third of the neck. It is then distributed to the teguments of the neck and side of the head, and to the glandula parotis and external ear, where it joins the portio dura. The third of the neck, passes out between the third and fourth vertebræ, and after sending forth a large branch forming the phenic nerve in the pericardium, is lost in the diaphragm. The fourth cervical nerve after sending a branch which joins with the third in forming the phrenic, runs to the axilla, where it meets the 5th, 6th, and 7th cervicals and first dorsal. These pass off in various directions to the superior extremity, and are called by proper names, as the cutaneous, musculo-cutaneous, muscularis, ulnaris, radialis, articularis, &c.

The twelve dorsal nerves communicate with each other. On passing out between the vertebræ, each nerve gives a posterior branch to the musculi erectores trunci corporis. The first after sending off the brachial nerve, is bestowed on the pleura and intercostal muscles. The tenth and eleventh are mostly sent to the abdominal muscles. The twelfth communicates with the first lumbar, and is bestowed on the musculus quadratus lumbalis, and iliacus internus. The fifth lumbar also communicates and gives posterior branches. The first sends branches to the abdominal muscles, psoas, and iliacus, and to the teguments and muscles on the thigh, itself is lost in the crural. The second passes through the psoas, and is distributed as the first. The third is lost in the musculus pectineus. Branches from the three first make one trunk which runs along the pelvis, and is spent in the musculus triceps. This is called obturator, or posterior crural nerve. The anterior crural nerve is formed of branches from the first four lumbar nerves, which passing the psoas muscle escapes out of the abdomen. The rest of the fourth and fifth lumbar nerves join the three first which proceed from the os sacrum, and constitute the largest nerve of the body, called the schiatic or ischiatic nerve. This goes out at the hollow behind the great tubercle of the os ischium, and goes down the posterior part, giving off in its passage nerves to the teguments and muscles of the thigh and leg. It divides into two at the ham; the smaller part passes over the fibula, and is continued to the toes. The larger goes under the musculi gemelli, where it again divides, one part being spent in the muscles and teguments at the back of the leg, and the other passing by the inner ancle to the foot. The other nerves that come out of the os sacrum are sent to the organs of generation, &c.—See *Physiology and Comparative Anatomy.*

ANATROPE, in medical language, a relaxation of the stomach with loss of appetite.

ANCHILOPS, in medicine, a tumour in the great angle of the eye.

ANCHOR, a large iron instrument with a double hook at one end, and a ring at the other, to which the cable is fastened. It is thrown into the sea for the purpose of keeping vessels from driving away. There are several kinds. 1. The sheet anchor, which is the largest and only used in violent storms. 2. The two bowers, used for ships to ride in harbours or roads. 3. The stream anchor. 4. The grapnel. To give the iron for making anchors a proper temper, it is usual to join the hard with the soft. The shank of an anchor ought to be three times the length of the fluke.

ANCHOR-A-PEAK, is when the cable is perpendicular between the hawse and anchor. The anchor is said to come home when it will not take hold: and to be foul when the cable is twisted round the fluke. To shoe an anchor, is to fasten boards on the fluke that it may hold in soft ground. When the anchor hangs perpendicular at the ship's bow, it is called a cock-bill. Riding at anchor is the state of a ship at her moorings. Weighing anchor, is to heave it up by the windlass in order for sailing.

ANCHOR, in architecture, a carving so called from its resembling that instrument, placed as an ornament of the boultins of capitals of the Tuscan, Doric, and Ionic orders. In heraldry *anchor* is the emblem of hope.

ANCHORAGE or *Anchoring ground*, a good place for a ship to ride at anchor. The best is stiff clay or hard sand. *Anchorage, in law*, is a duty laid on vessels for the use of the port or harbour.

ANCHOVY, in ichthyology, a species of clupea, which see.

ANCHUSA, ALKANET, or BUGLOSS, a genus of the monogynia order and the pentandria class of plants, and in the natural method ranking under the 41st order *Asperifoliæ*. Calyx, a quinquepartite perianthium, oblong and persistent: corolla monopetalous and funnel-shaped, the throat closed with scales: the stamina consist of five short filaments; antheræ oblong, and covered: the pistillum has four germina, a filiform stylus, and obtuse stigma: no pericarpium, calyx containing the seeds in its bosom: seeds four. There are eight species.

ANCHILOSIS, in surgery, is applied to a stiffness and inflexibility of the joints.

ANCESTRUM, a genus of the diandria monogynia class and order, and of the natural order of rosacæ. Calyx four leaved; corolla none: stigma many parted: drupe, dry, hispid, one-celled. There are three species.

ANCON, in anatomy, the gibbous eminence, or flexure of the arm on which we rest when we lean.

ANCONES, in architecture, are the corners of walls, cross beams or rafters.

ANCONY. in mineralogy, a flat bar of ron about three feet in length, and a square ough knob at the end.

ANCYLE, in surgery, a distortion of the oints, occasioned by a settlement of the humours or a distension of the nerves.

ANCYLOGLOSSUM, a contraction of the ligaments of the tongue which prevents speech. It is only to be cured by surgical operation.

ANCYLOTOMUS, a knife for loosening the tongue.

ANDABATRÆ, among the Romans, a kind of gladiators who fought on horseback with their faces covered.

ANDANTE, in music, a time somewhat slow, and a performance distinct and exact, gentle, tender, and soothing.

ANDIRA, a tree which grows in Brazil, the wood of which is used in building. It is of the diadelphia decandria class and order.

ANDRACHNE, in botany, a genus of plants of the gynandria order, and the monoecia class. The male calyx consists of five leaves, corolla five petals: stamina five, and inserted into the stylus; female calyx, divided into five leaves: corolla none; styli, three; capsule, trilocular: seeds three. There are three species.

ANDRIA, public entertainments instituted by Minos of Crete, and afterwards adopted at Sparta.

ANDRAPODOCAPALI, slave merchants among the antients particularly at Athens.

ANDROGYNA, in botany, are those plants which bear male and female flowers, with stamens only, and some with pistils only on the same root.

ANDROLEPSY, in the Grecian laws, an action brought against those who protected murderers.

ANDROMEDA, in astronomy, a northern constellation consisting of twenty-seven stars visible to the naked eye.

ANDROMIDA, the marsh cystus, a genus of the monogynia order, and decandria class of plants: in the natural method ranking under the 18th order bicornes. Calyx a quinque partite peranthium, small, coloured, and persistent: corolla monopetalous, campanulated and quinquefid with reflected divisions: stamina, ten subulated filaments, shorter than the corolla: antheræ, two-horned and nodding; pistillum has a roundish germen, a cylindric stylus larger than the stamina and persistent.

ANDROPOGON, a genus of the polygamia monoecia class and order, and of the natural order of grasses. There are thirty-five species, the only remarkable of which is *Andropogus nardus*, from whence comes the spikenard or Indian nard. The spikenard is a congeries of small fibres, issuing from one head, and closely matted, so as to form a bunch. The fibres are supposed to be the head of the plant, but there are some who think they are the root. The spikenard has a bitter taste, and a strong smell. It is stomachic and carminative.

ANDROSACE, a genus of plants, the flower of which consists of one petal, wide at the mouth, and divided into five segments. The fruit is a globose unilocular capsule, containing several oval seeds affixed to a placenta. It belongs to the pentandria monogynia class, and is good in the gout, dropsy, and retention of urine. There are seven species.

ANDRYALA, a genus of plants, whose flower is monopetalous, and the seed, which is single, has no covering but the cup. It is of the syngenesia polygamia class, and has six species.

ANEE, a measure for grain, used in some parts of *France*; but at Lyons it means as much wine as an ass can carry, or 80 English quarts of wine measure.

ANEMOMETER, an instrument for measuring the strength of the wind, see *Pneumatics*.

ANEMONE, *wild-flower*, a genus of the polygynia order, and polyandria class of plants; ranking in the natural method under the 26th order multisilique. Calyx none: corolla consists of petals of two or three orders, three in each series, oblongish; stamina, numerous capillary filaments; antheræ, didymous, and erect. The pistillum has numerous germina in a head; the styli are pointed; stigmata obtuse, and an obtuse stigma; the pericarpium is a five-cornered capsule, with five cells and valves; seeds numerous. There are 25 species, chiefly natives of America, but grow well in this country.

ANEMOSCOPE, a machine shewing from what point the wind blows. This is done by an index moving on an upright circular plate, the index being turned by an horizontal axis, and this by an upright staff, on the top of which is the vane moved by the wind.

ANETHUM, *Dill*, in botany, a genus of umbelliferous plants of the digynia order, and pentandria class. The fruit is oval, compressed, striated: petals five, involute, entire, and short. There are three species, 1. *Anethum fœniculum*, or fennel, of which there are two varieties, the common and the sweet; both cultivated in gardens; the common is a perennial plant; but the sweet fennel dies after it has produced seed. 2. *Anethum graveolens*, or dill-plant is an annual plant. 3. *Finochio*, a sallad herb. Of the first species, both the seeds and roots are stomachic.

ANEURISM, in surgery, a throbbing humour distended with blood, formed by the rupture of an artery.

ANGEIOGRAPHY or **ANGEIOLOGY**, the description of the vessels of the human body, as the arteries, &c. See *Anatomy*.

ANGEL, a title given in the Revelations to bishops. In commerce it is the name of an antient gold coin, weighing four pennyweights. In the reign of Hen. VI. it was valued at 6s. 8d. but in that of Elizabeth at 10s.

ANGELICA, in botany, a genus of the digynia order, and pentandria class of plants; ranking in the natural method, under the 45th order, umbellatæ. The fruit is roundish, angled, solid with reflecting styli; corolla equal and petals incurvated. There are six species, the angelica, archangelica, sativa or common angelica, which is cultivated in gardens for medicinal purposes. The root is used as an aromatic tincture, and the stalks make an agreeable sweetmeat.

ANGELOT, a gold coin struck at Paris when in the *hands* of the English, and so called from its bearing a representation of an angel holding the arms of France and England.

ANGINA, in medicine, an inflammation of the throat, called also the quinsey. Angina pectoris is a disease so called from the region of the complaint, which is attended with the sense of strangling.

ANGIOSPERMIA, in botany, are those plants of the didynamia class, whose seeds are contained in a capsule.

ANGLE, in geometry, the inclination of two lines meeting together in a point.

ANGLING, the art of fishing with a rod, to which are attached a line, hook, and bait.

The following are the rules for this sport. 1. Place yourself in such a manner that your shadow does not fall on the water, if shallow. 2. Angle in a pond near the ford where the cattle go to drink, and in rivers in those places where the fish usually frequent; as, for bream, in the deepest water; for eels under banks; for chub in deep shaded holes; for perch and roach in scours; and for trout in quick streams. The best season for angling, is from April to October; for in cold stormy weather, the fish will not bite. The time of the day in warm months is about nine o'clock in the morning, and between three and five in the afternoon. To attract the fish to the place where you purpose to angle, cast in for four or five days, some corn boiled soft, garbage, worms cut small, or grains steeped in blood and dried; and if you fish in a stream, cast in the grains above the hook. The best way of angling with the fly is down the river; and to make the fish rise freely, use such flies as they like, and in the manner they are used to receive them.

ANGON, an old military weapon, resembling a javelin, which was darted at a considerable distance.

ANGUINA, the water melon, a genus of the diandia order, and monoecia class of plants; and in the natural method, ranked under the 34th order, cucurbitaceæ. There are three species: 1. Anguina pedata. 2. Anguina trifolata. 3. Anguina trilobata. There is only one in this country, which is called citoul.

ANGUINUM *lapis*, a supposed stone in Germany of a cylindrical form, and of a yellow colour. According to the vulgar notion it is produced from a serpent, but in reality it is made of glass.

ANGUINUM OVUM, a fabulous sort of egg, said by the antients to be produced by the saliva of serpents, and to possess magical virtues. It is a name also given to the lapis scolopendrites.

ANGUIS, in natural history, the name of a genus belonging to the order of amphibia serpentes. The general characters are these. They are squamous or scaly in the belly, and under the tail without scuta. There are 15 species. 1. The eryx, a native of Britain and America, is about the length of a span, and the thickness of a man's finger. 2. The *fragilis*, blind worm or slow worm, grows to about a foot in length, and to the thickness of the little finger. The head is small, and the neck slender; the tail ends quite blunt. The colour of the back is cinereous, marked
with small lines of black spe
sides are reddish, the belly dus
tongue broad and forked; the
nute but numerous; the scales
resembles the viper in prod
young. It is frequent in gar
pastures, where it lives chie
ground, and feeds on worms.
ventralis, or glass snake of Ca
a small head. The upper pa
body is of a mixed brown and
lour, spotted with yellow. Th
smooth and shining, with small
small blow with a stick, will
body to separate in two or thre
They are numerous in Virginia
lina, and are said to be harmless.
jaculus or dart snake, is about th
breadth long, and the thickness
finger. It is of a light grey colou
gated with small black spots; th
white; the neck is all black, an
run two white streaks to the
vibrates its body like a dart, and
tive of Egypt and Libya. 5. T
drupes is of a cylindrical body,
coloured streaks; the teeth are
it has no ears. The feet are ver
from each other, and extremel
with five toes and small nails.
native of Java. 6. The *bipes* is
of India, and has two short feet
anus. 7. The *maleagus* is also a
India, it has small teeth and no
The *colubrina* is a native of Egypt
beautifully marked with pale and
colours. 9. The *maculata* inhab
rica: it is yellow, with ash-colour
on the back. 10. The *reticulata*
native of America, and has brown
with a white margin. 11. The
with 200 squamæ on the belly, an
the tail, is a native of Egypt.
lumbricalis, a native of America,
squamæ on the belly, and 7 on the
is of a yellowish white colour. 1
platura has an oblong head withou
the body about 18 inches long, black
and white below; the tail is flat
scales innumerable. 14. The *lati*
a native of Surinam. 15. The
a native of the Indies, the head is
and oval, and the eyes little. It is
ches in length, and of a white colou
brown wings; the top of the hea
None of this genus are poisonous.

ANGUSTICLAVIA, a tunic, orn
ed with purple studs, worn by the
knights.

ANIMAL, in natural history, an
ized and living body endowed with
tion.

ANIMAL *manures*, in agricultu
those formed from the decompos
animal substances, as flesh, bones
&c. These are the most servicea
promoting vegetation.

ANIMAL *secretion*, the separa
the fluids of the body from the bloo

ANIMAL *system*, is the whole
beings endowed with life and sen
called also the animal kingdom.

ANIMAL *fossile substances*, are
found bedded at considerable dep
the strata of the earth, and are chie
shells; the teeth and bones of fishe
bones of land animals; and fishes

ULE, an animal so minute as
ernible without the help of
pe.
nalcules are numerous, the
w. The principal distinction
is, that some have tails, and
ithout them; some have vi-
and others not. They are
anged into three classes, 1.
those which are without
a. 2. Cercaria, those which
. Arthronia, those which have
. They are found in most

D *power*, in mechanics, signi-
essed or possessed by a man
al, in opposition to weights or

ON, the informing of a body
for suspended animation, see

or *Gum Animæ*, a resinous
ble, inflammable, and soluble
pirit. There are two kinds,
nd occidental, the first is dry
ent colours. The occidental
ish white, and smells like
. Both are used in medicine
ry.
n heraldry, is when the eyes
e animal are born of a di-
from the creature itself.
L, the glands under the
likewise lactinea.
, a root which grows in the
and used in refining sugar.
m, a small seed of an ob-
sed in medicine.—See *Pim-*

liquid measure in Holland,
out 32 English gallons.
in literature, denote the re-
nts in a chronological order.
, in ecclesiastical affairs, are
us or the year's income of a
r church preferment. They
rly given to the pope, but at
ion were vested in the king
t restored them to the church
them to the augmentation of

NG, or *nealing*, a process in
ture of glass vessels by put-
while hot into a furnace or
hot as to remelt them, where
adually. This prevents them
g so easily as they otherwise
ere is this difference between
and unannealed glass, that
ter is broken, it is apt to fly in-
wder, as is the case with what
Prince Rupert's drops, which
s of common glass that fall
d, on which bottles are made,
A similar process is used for
s iron vessels less brittle.
TION, in law, is the uniting
ents to the crown.
, among the Romans denoted
provision provided for a year;
wance of oil, salt, bread, &c.
contractors for the army.
A or *custard apple*, in botany, a
e polyandria polygynia class.
There are ten species, the
ich are, 1. The annona muri-
sop which grows above 20 feet
he fruit is large and oval, of a greenish yellow colour, rough on the outside; the pulp is soft, white, and of a sour sweet taste, with dark seeds. 2. The annona palustris or water apple, grows to the height of above 30 feet. 3. The annona reticulata or custard apple, grows to the height of 25 feet, the fruit is as large as a tennis ball, of an orange colour, having a soft pulp like custard. These three are natives of the West Indies. 4. The annona triloba or North American annona, called by the inhabitants papau, is a native of Virginia, Carolina, and the Bahama islands. It is about 12 or 13 feet high. The fruit grows in clusters, and is of a yellow colour with pulp of a sweet taste. This tree has an offensive smell. It will grow in England in warm sheltered situations, but the plants must be reared in pots. The other sorts must be kept in stoves.

ANNOTATION, in literature, means a commentary upon some difficult passage in a book or writing.

ANNOTTO, a red dye brought from Spanish America. It is procured from the pulp of the seed-capsules of a tree called vixa. The annotto is prepared by throwing the contents of the capsules into a wooden bowl containing as much hot water as will suspend the red matter or pulp. When the seeds become naked they are taken out. After the water is settled, it is poured off and the sediment dried in the shade. It is then made into cakes for exportation.

ANNUAL, whatever returns once a year. In Scotch law, it means a yearly revenue or rent payable at Whitsuntide and Martinmas.

ANNUAL *plants*, are those which only live a year. *Annual leaves* are those which shoot out in the spring, and fall in the autumn.

ANNUENTES MUSCULI, in anatomy, are the same as the *recti interni minores*.

ANNUITIES, periodical payments of money, either annual or at other intervals of time. Annuities are divided into such as are *certain* and such as depend on some *contingency*, as the life of a person, &c. They are also divided into annuities in *possession* and annuities in *reversion*, the former having actually commenced, but the latter will not till the occurrence of a particular event.

Calculations with regard to annuities are made on the principle of compound interest, and are generally formed for an annuity of £1, whence the value of any other is easily obtained. Let r represent the amount of £1 in one year; that is, one pound increased by a year's interest, then r^n or r, raised to the power whose exponent is any given number of years, will be the amount of £1 for that number; its increase in the same period is $r^n - 1$; now the interest for a year is $r - 1$; therefore as $r - 1$ is to $r^n - 1$, so is x (that is, any given annuity) to a or its amount. Hence

$$\frac{x \times \overline{r^n - 1}}{r - 1} = a,$$

and thus the amount of any annuity for any number of years may be found. In this manner also is the present value of annuities obtained, for as £1 is the present value of r^n its amount in n years, and as the present value of any other amount, and consequently of $\frac{\overline{x \times r^n - 1}}{r - 1}$ must be in proportion to that amount we have therefore

$$\frac{\overline{x \times 1 - \frac{1}{r^n}}}{r - 1} \text{ or } \frac{x - \frac{x}{r^n}}{r - 1} = p.$$

And from these theorems the other cases relating to annuities may be deduced.

The easiest mode of solving these questions is by logarithms; but for dispatch, accurate tables of the amount and present worth of annuities have been calculated by different persons, and inserted in most books on compound interest or annuities.

ANNUITY, in law, a contract by which a person grants another a certain sum yearly.

ANNULAR, in anatomy, that which resembles a ring; thus the annular cartilage is the second cartilage of the larynx, &c.

ANNULET, in architecture, a square member in the doric capital under the quarter round; also a narrow flat moulding in the bases, capitals, &c. of columns. This is called by some a fillet, listel, square rabbit, &c. In heraldry, *annulet* is a mark of distinction born by the fifth brother of a family.

ANNULUS, in geometry, a ring the area of which is equal to the difference of the outer and inner circles.

ANODYNE, a medical term for those remedies which mitigate pain.

ANOLYMPIADS, an appellation given by the Eleans to those Olympic games which were celebrated by the other states in Greece.

ANOMALISTICAL *year*, an astronomical term applied to the time taken up by the earth in passing through her orbit: also named the periodical year. It is longer than the tropical year owing to the precession of the equinoxes.

ANOMALOUS *verbs*, in grammar, are those which are not conjugated agreeably to the paradigm of their conjugation.

ANOMALY, in astronomy, an irregularity in the motion of the planets, by which they deviate from the aphelion or apogee.

ANOMIA, in zoology, a genus of insects of the order of vermes testacea. The shell is bivalvous and the valves unequal. There are 23 species, of which two only are natives of Britain. 1. The ephippum which has the habit of an oyster. 2. The squammata with shells resembling the scales of fish.

ANOMORHOMBOIDIA, in natural history, a genus of chrystalline spars which easily cleave in an horizontal direction, the plates being irregular arrangements of rhomboidal concretions.

ANONIS, *rest harrow*, a genus of plants whose flower is papillionaceous, and the fruit a pod containing a few kidney-shaped seeds. It is of the diadelphia class, and called by Linnæus *ononis*.

ANSÆ, in astronomy, those parts of Saturn's ring which are to be seen on each side of the planet.

ANSER, the trivial name of the common goose, see *Anas*.

ANSER, in astronomy, a star of the fifth or sixth magnitude in the milky way, between the Swan and Eagle.

ANSPESSADES, in the French army, a subaltern between the corporal and common men.

ANT, a well known insect. See *Formica* and *Termes*.

ANTA, in the antient architecture, a square pilaster at the corners of buildings.

ANTACIDS, a term applied to [illegible] medicines which correct the acid or [illegible] humours.

ANTAGONIST *muscles*, in anatomy, are those which possess opposite functions, as the flexors, and extensors, &c.

ANTALKALINES, medicines which have the property of correcting alkaline matters in the whole body.

ANTANACLASIS, in rhetoric, a figure which repeats the same word, but in a different sense, as *dum vivimus, vivamus*, and *let the dead bury their dead*.

ANTANAGOGE, in rhetoric, a figure of speech by which, when the accusation of an adversary cannot be answered, the opponent retorts on him the same or other crimes.

ANTARCTIC, that which is opposite to the arctic or northern pole; whence the antarctic circle is one of the lesser circles of the sphere, distant 23° 30′ from the south pole.

ANTARES, in astronomy, a star of the first magnitude, called also the Scorpion's heart.

ANTE, in heraldry, a term denoting that the parts are let into one another, in the same form as dovetails, &c.

ANTEAMBULONES, among the Romans, were servants who went before persons of rank to clear the way.

ANTECEDENT, in grammar, the word to which a relative has reference. In logic it is the first of the two propositions in an enthymema. In mathematics the first of the two terms of a ratio, or that which is compared to the other.

ANTECEDENT *Signs*, in medicine, are those which appear before the disease can be properly defined.

ANTECEDENT *Terms*, in mathematics, the first in any ratio.

ANTECEDENTIA, in astronomy, the apparent motion of a planet towards the west, or contrary to the order of the signs.

ANTEDATE, in law, a false or spurious date prior to that which it ought to have.

ANTEDILUVIAN, whatever existed before the flood. Various opinions have been held respecting the figure and constitution of the antediluvian earth. Dr. Thomas Burnet maintained in a very beautiful but visionary romance, that the globe had a uniform surface, consequently that it had neither seas nor mountains. Dr. Woodward on the other hand, contended in his Essay towards a Natural History of the Earth, that the state of the

he same as it is at present.
iston in his New Theory started
e notion that this earth was
t of the atmosphere of a comet.
ther systems have been publish-
ll of them necessarily conjec-

URAMENTUM, in the old En-
and customs, an oath which was
from the accuser and accused
o a trial or purgation.

PE, a genus of quadrupeds
eric character is, the horns
ith a bony case, pointing up-
ulated or wreathed, and per-
hey were formerly ranked with
ut now form a class between
and the deer. They are prin-
itants of Asia and Africa. They
ft, and have a practice when
rning round to look at their
hey associate in large herds
hilly countries; their food is
he shoots of trees; the flesh
ope is delicate, and the eyes
ul. There are 28 species. 1.
ian antelope, or pasan, has
tapering to the point. It is
et high, and inhabits the Cape
e and other parts of Africa.
oryx, or white antelope, is
on the face and limbs, which
colour. It is a native of an
Gulph of Basora. 3. Ante-
or algazel, is a native of
sia, and found also in some
. It is of the size of a fallow
a bright bay colour with a
, the horns are slender and
re near three feet in length.
Indian antelope, is one of the
genus, and is found in India
It is somewhat less than a
f a slate colour, the head of
; down the neck and part of
a black mane; on the breast
ent tuft of hair. The horns
sharp. 5. Antelope ourebi,
ight horns, a small head, and
the colour tawny but the
hite. The females are with-
They are found in Africa.
oreotragus, or klipspringer,
the Cape of Good Hope.
harnessed antelope, is of a
ur and very small. This ele-
is a native of Senegal, living
large herds. 8. Guininia,
telope. This is smaller than
nd of an elegant appearance,
colour is a yellowish brown.
n several parts of Africa from
e Cape of Good Hope. 9.
pygmy antelope, is a beauti-
e species, often confounded
gmy musk, to which it has a
lance. It is a native of the
of Africa, and remarkably
able, it is said, to leap a wall
high. It is of a bright bay co-
ntelope picta, or nilghau, is
beautiful species, which of
s been imported into Europe,
n England. When the males
ll on their knees, and gradu-
ng in that posture, at last
ng at each other with their
heads bent down. They are easily tamed. 11. Tragocamelus, or Hindostan antelope, is somewhat like a camel, having a bending neck and a protuberance over the shoulders. It is a native of India. 12. Bubalis, or cervine antelope, is a native of Africa, from Barbary to the Cape of Good Hope; it has a large head like an ox, and is about four feet long; the general colour of a brown red. 13. Strepsiceros, or striped antelope, is a native of the country about the Cape of Good Hope, it is near nine feet in length, and four in height; the colour is grey and the face brown, the sides and face are marked with white lines. 14. Rupcapra, or common antelope, is a native of Barbary and India; it is a little smaller than the fallow deer, and the colour is tawny brown above, and white below; the horns are long and black, and have a double flexure, first inwards and then outwards. 15. Lervia, or Gambian antelope, is a species little known. 16. Antelope saiga, or Scythian antelope, is an inhabitant of Poland, Moldavia Caucasus, and the desarts of Siberia; the female brings forth only one at a birth; they are so swift as to outstrip the fleetest horse. They are hunted by dogs and eagles for the sake of their flesh, horns, and skins. 17. Gutturosa, or Chinese antelope, abounds in the desarts between Tibet and China, and the country of the Mogul Tartars, frequenting the hills and rocky places. Its aversion to water is so great, that it will not go into a river to save its life when pursued by the dogs. 18. Subgutturosa, or Guldensted's antelope, is so called from the person who first described it in the Memoirs of the Academy of Petersburgh. It is found in Persia, and resembles the roebuck. 19. Antelope euchore, or springer. This inhabits the Cape of Good Hope, where it is called the *spring bock*, from its prodigious power of leaping. They migrate annually from the interior part, in herds, which they increase by the junction of other parties, till they consist of many thousands. In their progress they are followed by lyons, hyænas, and other wild beasts. They make periodical migrations in seven or eight years, in herds of many hundred thousands, from the interior parts of Terra de Natal, in their course they desolate Caffraria, not leaving a single blade of grass. When taken young they are easily tamed. 20. Antelope arundinacea, or *rit bock*, is so called from its frequenting reedy places. It is of the size of the roe-buck, and of a grey colour. 21. Antelope sylvatica, or *bos bock*, inhabits the woods at a considerable distance from the Cape of Good Hope. The colour is a dark brown above and white beneath. 22. Eleotragus, or cinereous antelope, is an elegant species, in colour of an ash grey and white. 23. Dorcas, or Barbary antelope, is about half the size of a fallow deer; the colour is a reddish brown above, and white below; the horns are round and twelve inches in length. 24. Kevela, or flat-horned antelope, very much resembles the preceding, except in the horns. It is found in Senegal, and has an odour like musk. 25. Pygarga or white-faced antelope, has a close resem-

likeness to the last mentioned, but is larger. 26. Antelope cerinna, or cerine, is smaller than the roe-buck, and is a native of Africa. 27. Sumatrensis, or the Sumatran antelope, is described by Mr. Marsden in his account of that island, under the name of Cambing-outan, or goat of the woods. 28. Leucophæa, or blue antelope, is of a very large size, and from the figure of the horns and the length of the hair, it connects the antelope with the goats.

ANTENNÆ, in entomology, are slender filaments on the heads of insects, called also horns and feelers.

ANTEFRAGMENTA, in the antient architecture, the same as the jams of a door; also carved ornaments on the architrave.

ANTEPENULTIMA, in grammar, the last syllable but two from the end of a word.

ANTEPREDICAMENTS, in logic, preliminary questions which illustrate the doctrine of predicaments and categories.

ANTESIGNANI, among the Romans, were soldiers placed to defend the standards; or the first body of heavy armed troops.

ANTESINISTRA, a term applied by the augurs of Rome to thunderbolts or birds which passed from the south to the east.

ANTESTARI, in Roman law, was the bearing witness against one who refused to make his appearance in court.

ANTHELION, a mock sun or meteor, seen through the clouds, and larger than the sun's disk.

ANTHELIX, in anatomy, the inward protuberance of the external ear.

ANTHELMINTICS, medicines good for destroying worms.

ANTHEMIS, *camomile*, in botany, a genus of the polygamia superflua order, and syngenesia class; and in the natural method ranking under the 49th order compositæ discoides. The receptaculum is chaffy, calyx, hemispheric, and subequal; the florets of the ray exceeding five. There are nineteen species, the principal of which are 1. *A. arabica*, grows near two feet high with a single flower at the top, from the empalement of which are two or three foot-stalks, each having a small flower like the childing marigold. 2. *A. nobilis*, or common camomile, grows in plenty upon commons. 3. *A. pyrethrum*, or pellitory of Spain, is a perennial plant, which grows wild in Spain and Portugal. 4. *A. tinctoria*, is also a perennial, which flowers from June to November; some of the flowers are white, others yellow. They are carminative, and anodyne; they are chiefly used externally in fermentations and emollient glysters.

ANTHERA, in botany, that part of the stamen which contains the fine dust, which in maturity it emits for the impregnation of the plants.

ANTHERICUM, *spider wort*, a genus of the monogynia order, and hexandria class of plants; and in the natural method ranking under the 10th order coronaria. Corolla, six oblong petals, expanding; pericarpium an ovate trisulcated capsule with three cells and three valves. There are 39 species. The anthericum frutescens was formerly called the onion-leaved aloe. It pro-

duces many ligneous br
root; the flowers are ye
tive of the Cape of Good

ANTHESTERIA, festiv
the spring at Athens, in
chus, and at which the
their slaves, as the Ro
Saturnalia.

ANTHISTIRIA, in bo
the trigynia order, and t
plants, ranking under
grasses; there is only
ciliata, or fringed anthis
native of India.

ANTHOCEROS, *horn f*
the order of algæ belong
togamia class of plants;
species. 1. *Anthoceros la*
Europe and America.
is a native of Germany
moist places and heaths.
or spotted anthoceros, i
island.

ANTHOLOGY, in li
course of flowers, or of
extracted from an auth
name given to a collecti
grams.

ANTHOLYZA, *mad*
of the monogynia orde
class of plants; in the
ranking under the 6th ord
calyx tubular, irregular a
wards; the capsule ben
there are seven species,
which are, 1. *Antholyza*
red round bulbous roots,
which appear in June
ripen in September. 2.
narrow furrowed leave
arises the flower stem,
high; the flowers grow
are of a white colour.
may be placed in the ope
ter in a green-house.

ANTHONY'S (St.) FI
to the erysipelas.

ANTHOSPERMUM,
genus of the dioecia ord
class of plants; in the
ranking under the 17
Calyx of the hermaphro
vided into four parts;
mina four, and pistilla
beneath the flower. M
same or separate flower
species; 1. Anthosperm
Anthospermum ciliare.
herbacea. The first is
gardens of the curious, a
by cuttings.

ANTHOXANTHUM,
a genus of the digynia o
class of plants; in the
ranking under the 13th
There are two species;
Indiana, a native of Ind
thum odoratum, or spr
is a native of Britain;
liest grasses and of a de

ANTHRAX, or burn
applied by the Greeks to
called the carbuncle.

ANTHROPOGLOTTU
term given to those anim
resemble those of the

ANTHROPOLITES,
the human body.

l of ten or twelve feet;
o the extremities of the
of a bright yellow co-
s cytisoides, or shrubby
mon to our gardens; it
nd the flowers are yel-
species are propagated
Anthyllis montana, or
l-wort, with wing leaves,
n the south of France;
a purple colour. 4. An-
with unequal winged
e of Wales; its flowers

k preposition, used in
s in different senses.
as before, as anti-cham-
rs against or in opposi-
corbutic, &c.

US, in antient poetry, a
bles; the two first being
hort.

in civil law, an acknow-
defendant has received
of it.

M, in anatomy, the hol-
e breast commonly call-
stomach.

CS, medicines against

, in botany, a genus of
ler, and octandria class,
nly one species, which is
t.

, in civil law, a cove-
who borrows money en-
ver his property to the
terest.

ulpture and painting, a
ition of figures, called
erque.

, in rhetoric, a figure

lustre, nor is it altered by being immersed in water. but if steam pass over it when red hot it suffers a rapid decomposition. When heated in an open vessel it combines with oxygen and evaporates in a white vapour, which being collected is called argentine flowers of antimony. Antimony combines easily with sulphur and phosphorus. Sulphuret of antimony may be formed by mixing its two component parts together and fusing them in a crucible. It is of a blue or grey colour, with a lustre next to the metallic, and is more fusible than antimony. According to Proust the sulphuret is composed of 75·1 of antimony and 24·9 of sulphur.

This substance is found native in great abundance; and to it the old chemists applied the term antimony, while the pure metal was called regulus of antimony. Phosphuret of antimony is obtained by mixing equal parts of antimony and phosphoric glass with a little charcoal powder, and melting them in a crucible. Another method is by fusing equal parts of antimony and phosphoric glass, or by dropping phosphorus into melted antimony. Antimony neither combines with azote nor muriatic acid; but it combines with most of the metals, though few of its alloys are applied to any useful purposes. That of tin and antimony is employed for making the plates on which music is engraved. The alloy of lead and antimony in the proportion of sixteen parts of the former and one of the latter is used for printing types

ANTIPATHES, a genus in the zoophyta order of vermes, the character of which is, animal grows in the form of a plant; stem within horny, with small spines; base expanded, the outside covered with

ANTIQUARY, one who studies the remains of former ages. There is a society of antiquaries in London, which was instituted in 1751; each member pays five guineas at admission and two guineas a year, or an additional sum of twenty-one guineas. They meet weekly, every Thursday evening, at Somerset house. There is a similar society at Edinburgh, instituted in 1780.

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ANTIRRHINUM, *snapdragon* or *calve's snout*, a genus of plants of the angiospermia order and didynamia class; ranking in the natural method under the 40th order. Essential characters: calyx five leaves; base of the corolla bent backwards; with pectoria; capsule bilocular. There are fifty-two species. The flower is beautiful; and the scarlet and crimson kinds are particularly ornamental on walls.

ANTISCII, in geography, people who live on different sides of the equator; and whose shadows at noon project different ways.

ANTISEPTICS, in the materia medica, denote substances which resist putrefaction. These are salts, myrrh, assafœtida, snake-root, pepper, ginger, saffron, contrayerva-root, &c.

ANTISTASIS, in oratory, a defence of an action on the ground that if it had not been done, a worse would have happened.

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it is farthest from the sun. The
f the aphelia of the primary pla-
e known by their apparent dia-
seeming least; and by their mo-
west in a given time. They may
found by calculation.

LLAN, the name of a bright star
ini.

IS, the puceron, vine-fretter, or
ouse, an extensive genus of insects
hemiptera order. There are 33
; each of which appears to be
d to a particular plant. They are
rey of ants and other creatures,
wise they would probably be more
ctive to the vegetable world than
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nce thought to be androgynes, till
periments of M. Bonnet determin-
r division into males and females.
ales, however, are produced only
tenth generation and are few in
r. The virtue of this copulation
for ten generations, all of which
the first are viviparous, and all
s, born impregnated, except the
before observed. A curious ac-
of them may be seen in the Phil.
vol. xi, Art 22.

IORISM, a maxim or principle in
ice, also a sentence of morality in
much is said in few words.

IRODISIA, festivals celebrated in
r of Venus, the most remarkable
centious was, in the island of Cy-

IRODITA, in zoology, a naked sea
of an oval shape and aculeated
perforation in the back.

ITHÆ, small ulcers in the mouth.
chiefly arise on the extremity of
ecretory vessels, salival glands, lips,

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s of gobius called the sea loch.

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It is supposed that their office is to impregnate the eggs of the queen after they are deposited in the cells; but according to a late writer on this subject (Mr. Bonner) this is a mispart tapers more; and her belly and legs are yellower, and her upper parts darker than those of other bees. Though furnished with a sting she very rarely uses it, and will bear being handled without being provoked. A young queen is smaller than a full grown one. When three or four days old she is quick in her motions, but when pregnant she becomes heavy. The common or working bees have the faculty of raising a queen bee from an egg in a common cell when they are in want of one. To do this, they choose a common cell in which is an egg, and inject a thick white liquid matter from their proboscis, they then build on the edges of the cell and enlarge it; on the fifth day the royal maggot appears in the form of a semicircle, in which form it swims in the midst of the matter in the cell; and on the seventh day it is sealed up. During which period she undergoes various metamorphoses. On the 14th or 15th day it comes forth a charming young queen bee. When a queen dies the bees of the hive cease working, consume their honey, fly about at random, and if not supplied with another sovereign soon pine away. On being provided with a new queen the flock revives, and exercise their labour with new pleasure. It is computed that the ovaria of a queen contain above 5000 eggs at once, and in the space of two months she may produce 10 or 12000 bees. The common bee is smaller than the queen or the drone. They have four wings fastened, by which they are able to fly with heavy loads. They have six legs, the two foremost are the shortest, and with these they discharge themselves of their loads. The two last are the largest, and on the outside of the middle joint of these is a cavity in which the bees collect the wax, which they carry home to their hives: this hollow is peculiar to the working bee. Each foot terminates in two hooks. The honey bladder is of the size of a small pea, and very transparent. The sting is horny and hollow, through which the poison is ejected. The wound inflicted by it is mortal to many insects; and the loss of the sting is death to the bee herself. With regard to the age of bees, the drones have a short life being soon killed by the working bees: these are supposed by some to be annual, but others think that they live many years. They have frequently fierce battles, and when the queen of one hive is killed, the war ends, and the two tribes unite. Some persons have obtained an extraordinary command over bees, particularly Mr. Wildman, about forty years ago, who could command a whole swarm to settle where he pleased; which he effected by getting possession of the queen, and placing her in the part where he intended the bees should settle. In working the bees are said to form themselves into four companies, one of which roves the fields in search of materials, another is employed in laying out the bottom and partitions of the cells, the third in smoothing the inside from the corners and angles, and the fourth in bringing food for the rest. Their diligence is so great, that in a day they will make cells which lie on each other, and sufficient to contain 3000 bees. To keep their habitations close they make use of a resinous gum, which the antients called *propolis*. At first it is soft but becomes firmer every day, and is harder than wax. They guard the entrance of the hive against insects by gluing up with wax or propolis, the smallest holes in it; and some stand as sentinels to prevent the intrusion of strangers. But if a snail or other large insect gets in they sting it to death; and then cover it over with propolis to prevent the bad smell, or maggots which might proceed from its putrefaction. Bees perceive the approach of bad weather, for when black clouds are in the sky indicating rain, they immediately hurry home with the greatest speed. When a hive is become too crowded, a part of the bees single out a young queen and look out for a new habitation, which having found, they set to work in procuring materials for building and food with the greatest diligence. The manner in which bees rest is by collecting themselves into a heap and hanging to each other by the hooks of their feet. The balls attached to the legs of bees returning to the hives consist of a powder gathered from the stamina of flowers, not yet brought to the state of wax. The bee when it enters the cup of the flower rolls itself till its whole body is covered with the yellow farina which is therein. It then brushes it off with its hind legs, and kneads it into two balls with which it returns to the hive. This substance is eaten by degrees, and being digested in the body of the bee it becomes wax. When there is a superfluous quantity of this undigested matter it is laid up in store, and is called bee-bread.

Hives are made of different materials, as of straw, wood, glass, &c. Single boxes have been found to answer well, and are preferred by some to straw hives. These last are easiest obtained at first, and are most generally used. If the swarm be early and large, it requires a large hive; but if otherwise, the hive should be less. If the bees want more room, it can be enlarged by adding a roll or two. In the management of an apiary, great care is requisite in choosing stock hives. In September every one of these should contain as much honey as will supply the bees till June. They should be full of combs and should weigh at least 30lbs. each. Bees first swarm at the end of April, or the beginning of May; they seldom swarm before 10 in the morning, and later than 3 in the afternoon. Just before they take flight there is an uncommon silence in the hive, after this, as soon as one takes flight all the rest follow. As soon as the swarm is settled, the bees should be got into a hive as quick as possible. By getting the queen into the hive the rest will enter without difficulty. The hive should be very clean, and the inside rubbed with fragrant herbs or flowers, or with honey. During the winter the bees are in a lethargic state, and little food supports them; but as they revive in a warm or sunny day the hive should have a proper supply of food. The best method is to set under the hive a plate f liquid honey with a paper full of holes hrough which the bees may feed without daubing themselves. If honey is not to be had, a mixture of brown sugar and strong beer will answer the purpose. In this country it is a custom in taking the treasures of these industrious insects to rob them of their lives by the fumes of burnt brimstone. Sir George Wheeler, in his travels in Greece (p. 411) says, that on mount *Hymethus* they have a method of saving the bees as follows: "the hives are made of willows or osiers, like common dust baskets, wide at the top and narrow at the bottom, and plastered over with clay. They are set with the wide end uppermost. The tops are covered with flat sticks which are plastered in the same way; and to secure them from the weather they cover them with straw, Along each side of these sticks the bees fasten their combs: so that a comb may be taken out easily without bruising. To increase them in the spring, they divide them, first separating the sticks on which the combs are fastened with a knife; so, taking out the first comb and bees together on each side, they put them into another basket in the same order. After this, they set the new basket in the place of the old one, and this in a new place. This is done in the middle of the day when most of the bees are abroad. In August they take out the honey which is also done in the day time; and in the same manner as before, leaving only such a quantity as is sufficient to maintain the bees in winter." Various methods have been also adopted in England to get the honey and wax without destroying the bees, an elaborate account of which may be seen in Thorley's Inquiry into the Nature, Order, and Government of Bees, to which we cheerfully refer.

Mr. Warner's method is simple and deserves to be generally known. Place the hive with the small end downward in a pail, peck, or flower pot, so as to make it stand firm; then take an empty hive and set it upon the former, and draw a cloth tight round the joining of the two hives, so that none of the bees may get out; after this, strike the full hive smartly, to disturb the bees that may be in it, but with such pauses as to allow them time to ascend into the other hive. When by the noise of the bees it is perceived that they are hived in this last, carry it to a cloth spread for the purpose before the colony with one end fastened to the landing place and knock them out upon it; they will soon crawl up the cloth and join their fellows who will gladly receive them.

Bees have various enemies, as mice, spiders, caterpillars, ants, woodlice and earwigs. But the most destructive are wasps and hornets. They are also apt to be troubled with lice which may be destroyed by strewing tobacco dust over them.

APIS, or musca, in astronomy, a southern constellation contaning four stars.

APIUM, *parsley*, in botany, a genus of the digynia order and pentandria class of plants; ranking in the natural method under the 45th order, umbellata. The fruit is oval and streaked, the involucrum consists of one leaf; and the petals inflated. There are only two species, 1. Apium graveolens or smallage, or celery, which is a native of England. 2. Apium petroselinum or common parsley, a native of Sardinia. The first is an excellent winter sallad and is aperient and tonic. The roots and seeds of the second are also aperient, but too freely used are apt to occasion flatulencies. The seeds are adopted in the electuary of bay-berries, and were formerly used as carminatives. The common parsley is said to be a cure for the rot in sheep, if they are fed with it twice a week, two or three hours at each time: hares and rabbits are very fond of it.

APLANATIC, in optics, that sort of refraction which corrects the aberration of the rays of light and the colour depending on it, as opposed to achromatic.

APLUDA, in botany, a genus of the monoecia order and polygamia class of plants; belonging in the natural method to the 4th order, gramina. Calyx a bivalved gluma; the female floscules, sessile, those of the male have pedunculi: female has no calyx; corolla a double valve: stylus one; with a single seed covered. The male has three stamina. There are four species.

APOCYNUM, *dog's bane*, a genus of the digynia order and pentandria class of plants; ranking in the natural method under the 30th order, contortæ. Corolla bell-shaped; filaments five, alternate with the stamina. There are 17 species, the chief of which are, 1. Apocynum cordatum et villosum, natives of South America. They are both climbers. 2. Apocynum speciosissimum, a native of Jamaica and Savannah, whence it is called the Savannah flower. Its height is 3 or 4 feet: the flowers grow on the sides of the branches, and are of a yellow colour. 3. Apocynum ventum; of this there two varieties, one bearing a purple and the other a white flower. They will live in England. All the species have a milky juice, which is deemed injurious if taken inwardly. The pods of all the sorts are full of seeds, each having a cottony down which is used in France for stuffing chairs, quilts, &c.

APOCOPE, in grammar, a figure by which a letter or syllable is cut off from the end of a word.

APOGEE, that point in the orbit of the sun or planet which is farthest from the earth.

APOLLINARIAN *games*, certain dramatic entertainments celebrated annually at Rome in honour of Apollo. The Ægialians termed a yearly festival of the same kind Apollonia.

APOLLO BELVIDERE, an antique statue found in the 15th century in the ruins of ancient Antium, and removed to the Belvidere of the Vatican, but it is now in the Museum at Paris.

APOLOGUE, in literature, a method of conveying instruction under a feigned representation, called a fable. Those of Æsop and Lokman are masterpieces in this kind.

APONEUROSIS, a medical term applied to the expansion of a nerve or tendon *in the manner* of a membrane.

APOPHYSIS, in anatomy, an excrescence from the body of a bone.

APOPLEXY, a disease by which the patient is suddenly deprived of motion and sense, while a strong pulse remains, with a deep respiration.

APOSIOPESIS, in rhetoric, the omission of part of a narration in such a manner as if the person purposely avoided to speak of it.

APOSTATE, in the Roman church, denotes a man who abandons a religious order or ecclesiastical state without a dispensation; whence *apostata capiendo* in the old English law was a writ which lay against a person of this description.

APOSTROPHE, in rhetoric, a figure by which an absent or dead person is addressed as if he were present; also an appeal to angels, animals, and other objects; thus in Milton,

O woods, O fountains, hillocks, dales,
and bowers, &c.

In grammar, apostrophe is a mark placed over a letter to shew that a vowel is cut off, thus, *'tis* for *it is*.

APOTHECARY, a person who practises pharmacy. In London, apothecaries are one of the city companies, made perpetual by George I. and are exempted from juries, and ward and parish offices.

APOTHEOSIS, a ceremony by which the Romans complimented their great men, with placing them, after death, among the gods.

APOTOME, in geometry, the difference between two incommensurable lines. In music, *apotome* is the difference between a greater and lesser semitone, thus expressed, 128: 25.

APPARENT, in mathematics, denotes things according to their appearance, in contradistinction to the real, as the apparent diameter, &c.

APPARITION, in astronomy, is the visible appearance of a star; and is opposed to occultation. In metaphysics it means the appearance of a supernatural being in a human form.

APPARITOR, among the Romans, was a term applied, generally, to the attendants on magistrates. In England, it means a messenger belonging to the ecclesiastical court.

APPEAL, in law, the removal of a cause from an inferior to a superior court. Appeals lie from all the ordinary courts to the house of lords.

APPEARANCE, in law, denotes the defendant's finding common or special bail on any process issued out against him. In perspective, appearance is the projection of a figure on the perspective plane. In astronomy it is the same as phœnomenena or phases; and in physiology equivalent to phasmata.

APPELLATIVE, in grammar, a noun applicable to a whole species, as man, sheep, &c.

APPENDANT, in law, that which is inheritable and belonging to a more worthy inheritance: as an advowson, or common may be appendant to an office, &c.

APPLICATION, in geometry, the applying of one quantity to another, whose areas, but not the figures, are the same. Also the transferring a given line into a figure, in such a manner that its ends shall be in the perimeter thereof. Application, in arithmetic, is the same as division. The application of one science to another, is the use made of any of its principles for the illustration or perfection of that to which it is applied: thus algebra is applied to geometry, &c.

APPOINTEE, in heraldry, that which terminates in points.

APPORTIONMENT, in law, the division of a rent into parts, in the same manner as the land, out of which it issues, is divided.

APPOSAL of sheriffs, is the charging them with money received on their accounts in the exchequer.

APPOSITION, in grammar, is the placing two or more substantives together, in the same case, without a completive conjunction.

APPRAISING, is the setting a value upon goods: usually done by a person sworn to the office, who, if he values the articles too high, is obliged to take them at that price.

APPREHENSION, in logic, the simple attention of the mind to an object either presented to the senses or the imagination. It also denotes an imperfect idea.

APPRENTICE, a youth bound by indenture to a tradesman to be instructed by him in the art or mystery he professes. A master may be indicted for not providing, or for turning away his apprentice: and the apprentice, again, may be committed to Bridewell for neglecting his duty. By 5 Eliz. no one can exercise a trade without having served a regular apprenticeship of seven years: but no trades are within this statute but those which were then in use. Neither does this statute extend to villages: and the following a trade either as master or servant is sufficient without an apprenticeship.

APPRISING, in the Scotch law, is an action by which a creditor formerly became invested with the estate of his debtor.

APPROACH, (a curve of equable) is one of such a nature, that the body descending in it by the power of gravity, comes to the horizon equally in equal times.

APPROACHES, a mathematical term for a method of resolving certain problems which relate to square numbers, by first assigning limits to the quantities required, and so approaching by degrees, till a perfect coincidence is had. The double rule of false position is of this kind. In fortification *approaches* are the works thrown up by the besiegers to get nearer to a fortress: as the trenches, &c.

APPROACHING, in fowling, is a method of getting near to the birds under a concealment of hoops, and boughs of trees.

APPROPRIARE *communiam*, in law, the inclosing of that which was before open and common.

APPROPRIATION, is the annexing of a benefice to a bishopric, college, &c. There are in England 2745 of these.

APPROVEMENT, in law, the inclosing part of a common by the lord of the manor.

APPROVER, in law, one who accuses

his accomplices of a crime; also bailiffs of lords in their franchises, sheriffs, &c.

APPROXIMATION, in mathematics, the coming nearer by degrees to a root or quantity sought, without being able to find it exactly. Thus,

$\sqrt{2} = 1\cdot41421356$, &c. = the approximating series $1+\frac{4}{10}+\frac{1}{100}+\frac{4}{1000}+\frac{2}{10000}$ + &c. or supposing $x=\frac{1}{10}$ equal to the series $1\times\frac{4}{x}+\frac{1}{x^2}+\frac{4}{x^3}+\frac{2}{x^4}$ + &c. $= x+4x^{-1}+x^{-2}+4x^{-3}+2x^{-4}$ + &c.

The easiest method of approximation is by the rule of double position, and the best for the roots of pure powers is the following of Dr. Hutton.

If N denote any number out of which is to be extracted the root whose index is r, and if n be the nearest root first taken; then shall $\frac{r+1\,.\,N+r-1\,.\,nr}{r-1\,.\,N+r+1\,.\,nr}\times n$, be very nearly the required root of N, or as $r-1$ times the given number added to $r-1$ times the nearest power, so is very nearly the assumed root n, to the required root. Then this last value so found if a root still nearer be wanted is to be used for n in the same theorem to repeat the operation with it; and so on repeating the operation as often as is necessary.

APPROXIMATION, *of the roots of equation*, Sir Isaac Newton's method of approximating roots, is this: first take a value of the root as near as may be; then assuming another letter to denote the unknown difference between this and the true value, substitute into the equation the sum or difference of the approximate root, and this assumed letter, instead of the unknown letter or root of the equation, which will produce a new equation, having only the assumed small difference for its root or unknown letter: and by any means, find from this equation, a near value of this small assumed quantity. Assume, then, another letter for the small difference between this last value and the true one, and substitute the sum or difference into the last equation, which will give a third equation, involving the second assumed quantity, whose near value is found as before. Proceeding thus all the near values connected together by their proper signs, will form a series approaching nearer and nearer to the true value of the root of the first or proposed equation. The approximate values of the several small assumed differences may be found in different ways; Sir I. Newton's method is this: as the quantity sought is small, its higher powers decrease more and more, and consequently neglecting them will not cause any material error. He, therefore, neglects all the terms having the second and higher powers, leaving only the first power and the absolute known term; from which simple equation he finds the value of the assumed unknown letter nearly.

APPULSE, in astronomy, the approach of a planet towards a conjunction with the sun or any of the fixed stars.

APPURTENANCES, in law, are things which belong to another as principal; such are hamlets to manors and common of pasture and fishery.

APRON, a piece of lead which covers the touchhole of a cannon.

APSIS, in astronomy, either of the two points of a planet's orbit wherein it is nearest to or farthest from the sun or earth. The line connecting these points is called the line of the apsides.

APTENODYTES, a genus of birds in the southern hemisphere resembling the auks of the northern. They are found only in the temperate and frigid zones.

APTERA, in zoology, the last order of insects, or those which have no wings, as the louse, flea, acarus, &c.

APTOTE, in grammar, an indeclinable noun, or one which has no variation of cases.

APUS, *avis indica*, in astronomy, a constellation of the southern hemisphere near the pole, which in Bayer's catalogue is said to have 13 stars.

AQUA, *water*, a term in medical writings, applied to certain medicines or menstrua in a liquid form, and distinguished from each other by particular epithets, as aqua aluminosa, aqua fortis, &c.

AQUA FORTIS, See *Chemistry*.

AQUA MARINA, among jewellers, is a term applied to the beryl on account of its sea-green colour.

AQUA REGIA, the nitric and muriatic acids in a state of combination. It is now called nitro-muriatic acid and dissolves gold.

AQUA SECUNDA, aqua fortis diluted with water.

AQUA VITÆ, the same as the eau de vie of the French and the usquebaugh of the Irish. It is a familiar name for native distilled spirits.

AQUEDUCT, a conveyance for carrying water from one place to another. The Romans constructed some magnificent works of this kind; and the most remarkable by the moderns was that built by Louis XIV. for carrying the Bucq to Versailles, it is 7000 fathoms long with 2560 fathoms of elevation.

AQUARIUS, in astronomy, the eleventh sign in the zodiac. In Ptolemy's catalogue it consists of 45 stars; in Tycho's 40; and in Flamstead's 108.

AQUARTIA, in botany, a genus of the class and order tetrandria monogynia. The essential character is, calyx bell-shaped; corolla wheel shaped with linear divisions, berry many seeded. There is only one species which is a native of South America.

AQUATINTA, a mode of engraving which resembles drawing in Indian ink. The process consists in eating the copper with aqua fortis, in such a manner that an impression from it appears like a tint laid on the paper. This is done by covering the copper with a substance which *prevents* the aqua fortis from *acting where* it adheres. When the particles are minute and near each other, the impression from the plate appears like a wash of Indian ink. The matter generally used for this purpose consists of equal parts of asphaltum and transparent rosin reduced to powder and sifted on the plate previously greased. The plate is then heated to make the powder adhere, and the artist scrapes it away where a strong shade is wanted, and covers those parts with varnish where a strong light is needed. The aquafortis is then put on as in common etching.

AQUEOUS *humour*, or the albugineous matter, in anatomy, is the front of the three humours of the eye, in the space between the cornea and crystalline.

AQUILA, in astronomy, a constellation of the northern hemisphere, consisting of 15 stars in Ptolemy's catalogue, 17 in Tycho's, and 71 in Flamstead's.

AQUILARIA, in botany, a genus of plants of the class and order decandria monogynia. The character is, calyx five cleft; corolla none; nectarium, pitcher shaped; half five cleft with bifid clefts; capsule superior, woody, two celled, two valved; seeds solitary. There is only one species, which is a large tree in Malacca and Cochin China. The lignum aloes is a resinous matter produced by a disease in this tree; and is highly valued in the east as a perfume. The Cochin-Chinese make writing paper of the bark of this tree.

AQUILEGIA, *Columbine*, in botany, a genus of the pentagynia order and polyandria class of plants; ranking in the natural method under the 16th order, multisiliquæ. It has no calyx; petals five; and five separate capsules. There are five species, 1. *aquilegia alpina*, grows wild in Yorkshire. The flowers are larger than those of the garden columbine. 2. *Aquilegia Canadensis*, or Canadian columbine, flowers near a month before the other sorts. 3. *Aquilegia inversa*, or garden columbine. There are great varieties of this species, some of them finely variegated. 4. *Aquilegia vulgaris*, or wild columbine, with blue flowers. It grows naturally in woods. 5. *Aquilegia viridiflora*.

ARA, in astronomy, a southern constellation containing eight stars.

ARABESQUE, or MORESQUE, a style of painting or sculpture called after the Arabians and Moors whose religion forbad them to make representations of human or animal figures in places of worship.

ARABIC *Characters*, are the figures made use of in arithmetic.

ARABIC *(gum)* is distilled from a species of mimosa. The best is of a white colour. It is good in fluxes and catarrhs; and is used for painting in water colours.

ARABIS, *bastard tower mustard*, in botany, a genus of the siliquose order and tetradynamia class of plants; and in the natural method ranking under the 39th order, siliquosæ. There are 14 species, but none of them remarkable. The arabis thaliana or mouse ear, is a native of Britain and grows on sandy soils or old walls.

ARACHIS, in botany, a genus of the *diadelphia-decandria* class; the flower is papilionaceous and has three petals: the fruit is an oblong pod. There are two species which grow in Peru, Brazil, and Carolina: the seed is a kind of nut which is thus perfected; when the flower falls off, the germ enters the ground, and there the pod is formed, whence it is called ground-nut. It is eaten by the negroes.

ARACHNOIDES, in zoology, a name applied to the sea hedgehogs or echini marini, which are round but indented at the edges.—Also a species of madrepora found in a fossil state. In anatomy arachnoides is a term given to membranes as the tunic of the crystalline humour of the eye, the external lamina of the pia mater, and one of the coverings of the spinal marrow.

ARÆOMETER, an instrument to measure the specific gravity of liquors. It consists of a thin glass globe, with a taper neck, sealed at the top, and containing mercury sufficient to make it swim upright. The neck is divided into two parts on which are numbers that indicate the weight of the liquor into which the instrument is placed.

ARÆOSTYLE, in architecture, a term made use of by Vitruvius for the greatest space that can be made between columns which is eight modules or four diameters.

ARAIGNEE, in fortification, the branch return or galley of a mine.

ARALIA, in botany, a genus of plants of the pentandria pentagynia class. The essential character is, flowers in an umbellule, with an involucrum; calyx 5-toothed superior; corolla 5-petalled; berry 5-seeded. The flowers are rosaceous. There are 9 species mostly shrubs and natives of China and South America; but they may be cultivated in England.

ARAMPO, or *man eater*, a long slender animal like a weazel which digs up graves and devours human bodies. It is a native of Guinea.

ARANEA, or *spider*, a genus of insects of the order of aptera. All the species, of which there are 30, have eight legs and three crooked claws at the end of each; eight eyes, two before, two behind, and the rest on the sides of the head. The mouth has a pair of sharp crooked claws or forceps which fold like a clasp knife having between two rows of teeth. The belly is separated from the rest of the body by a small tube. On this belly are five nipples, the apertures of which the spider can enlarge or contract at pleasure. Through these it spins a substance like glue, with which the belly is filled. The spiders fix the end of their threads by applying the nipples to any substance and the thread lengthens in proportion as the animal recedes from it. They can stop the issuing of the threads by contracting the aperture and then reascend by their claws. When the common house-spider begins her web, she generally chooses a corner of a room, then fixes one end of her threads to the wall, and passes on to the other side drawing the thread after. Thus she passes and repasses till she has made as many parallel threads as are necessary for her purpose. Then she crosses them by other parallel threads which may be called the woof,

f a jet; this thread taken up by
was carried to some fathoms, still
ut of the belly of the animal.
spider leaped into the air and
l carried her up swiftly. To de-
o what heights the spiders will
e went to the top of the highest
York minster and could there
hem exceedingly high above him.
only thus shoot their threads up-
ut also horizontally, as may be
their threads running from wall
n large gardens. Garden spiders
rly the short-legged species, yield
silk, and M. Bon of Languedoc
0 years ago manufactured from
of stockings and one of mittens of
ul colour and nearly as strong as
de of common silk; but M. Reau-
determined that the silk is weak
l in quantity. The most remark-
lers are, 1. Aranea aquatica or
r spider, which is amphibious.
bright in the water, owing to a
f air attached to the abdomen by
ours which transpire from the
prevent the immediate contact
ater. This bubble is the sub-
its dwelling, which it constructs
ter, by fixing several threads to
of plants and then ascending to
e thrusts its hinder part above
r drawing it back again so rapidly
ch beneath a bubble of air which
art of detaining under water by
it underneath the threads and
binds like a covering around the
Then it ascends for another, and
l it has formed a large aerial a-
t under the water. In winter it
empty shells which it closes with
2. Aranea avicularia, is a native
ca, and feeds on small birds, in-
. Its bite is very venomous. 3.
alycina lives in the cups of flow-
atches bees and flies. 4. Aranea

er than leave this behind. 12. Aranea Tarantula, has the breast and belly and legs of an ash colour; two of its eyes are larger than the other, red, and placed in the front; four others are in a transverse direction towards the mouth. It is a native of Italy, Cyprus, Barbary, and the East Indies. It lives in fields, at the depth of four inches in the ground where it weaves a net at the mouth of the hole. These spiders do not live a year, and in July they shed their skin. The ichneumon is a great enemy to them. The bite of the tarantula is said to cause an inflammation which produces sickness, difficulty of breathing, and faintness. These symptoms return yearly and at last end in death. The long-credited notion that music is the only cure for the bite of the tarantula is now exploded; and the exhibitions of dancing to music by persons pretending to have been bitten, are gross impostures. 13. Aranea viatica or wanderer, is of a yellow colour and found upon plants. Though it has no motion of the head it has immoveable eyes by which it perceives all the flies that hover about it and catches them by its long arms which are furnished with feathers. It carries its eggs in a ball of silk and is said to sit on them.

ARANEA, in mineralogy, a silver ore found in the mines of Potosi. It consists of threads somewhat like a cobweb.

ARBITER, in civil law, a judge appointed by the magistrate or chosen by two parties to decide between them. There is this difference between an arbiter and an arbitrator, that the former must judge according to the usages of law, but the latter has a discretionary power.

ARBITRATION, in law, is when two or more contending parties agree to leave the subject of their difference to the determination, of one, two or three persons. The submission to arbitration must be

The arc of a circle may be thus found, as 180° : number of degrees in the arc :: 3·1416 times the radius : length; for when the radius is one half, the circumference is 3·14159, &c. therefore $\frac{3{\cdot}14159}{180}$, &c. = ·01745329, &c. = the length of an arc of one degree. Hence $r \times$ ·01745, &c. = the length of 1° to the radius r; therefore $r \times$ 0·1745, &c. × the number of degrees in any arc = the length of the arc.

The length of circular arcs are thus found; the radius of a circle being 1, and of any arc a, if the tangent be t, the sine s, the cosine c, and the versed sine v; then the arc a will be expressed by several sines, viz.

$$a=t-\frac{1}{3}t^3+\frac{1}{5}t^5-\frac{1}{7}t^7+\frac{1}{9}t^9 \text{ \&c.}$$

$$a=\frac{s}{c}.-\frac{1}{3}.\frac{s^3}{c^3}+\frac{1}{5}.\frac{s}{c^5}+\frac{1}{7}.\frac{s^7}{c^7}-\text{\&c.}$$

$$a=s+\frac{1}{2.3}s^3+\frac{1.3}{2.4.5}s^5+\frac{1.3.5}{2.4.6.7}s^7 \text{ \&c.}$$

$$a=\sqrt{2v}\times\left(1+\frac{1}{2.3}.\frac{v}{2}+\frac{1.3}{2.4.5}.\frac{v^2}{2^2}+\frac{1.3.5}{2.4.6.7}.\frac{v^3}{2^3} \text{ \&c.}\right.$$

$$a=\frac{3{\cdot}14159, \text{ \&c.}}{180}d = {\cdot}01745329, \text{ \&c.} \times d$$

where d denotes the degrees in the arc. Also $a = \frac{8c-c}{3}$ nearly; where c is the chord of the arc, and c the chord of half the arc, let the radius be what it may.

To discover the length of the arc of any curve. Put x = the absciss, y = the ordinate of the arc z, of any curve. Put $\dot z = \sqrt{\dot x^2+\dot y^2}$; then by the equation of the curve find the value of $\dot x$ in terms of $\dot y$, or of $\dot y$ in terms of $\dot x$ and substitute that value in its stead in the above expression $\dot z = \sqrt{\dot x^2+\dot y^2}$; hence the fluents will give the length of the arc z in terms of x or y.

ARCH *of Equilibration*, is that which is in equilibrium in all its parts. Every particular figure of the extrados or upper side of the wall above an arch requires a peculiar curve for the under side of the arch, to form one of equilibration, so that the incumbent pressure on every part may be proportional to the strength or resistance there. When the arch is equally thick throughout, the catenarian curve is the arch of equilibration but in this case only; wherefore it is an error in some authors to make this curve the best figure for arches in all cases. See Hutton on the Principles of Bridges, and the same author's Mathematical and Philosophical Dictionary.

ARCS, (*similar*), are those which have a corresponding number of degrees; or when the radius of one curve is to that of another, as their respective arches. *Equal Arcs* are those whose radii and number of degrees are equal.

ARC, *diurnal*, is that part of a circle described by a celestial body between its rising and setting; and the nocturnal arch is the contrary.

ARC of *progression*, or *direction*, is an arch of the zodiac, which a planet appears to pass over, where its motion is according to the signs.

ARC of *retrogradation*, is an arch of the zodiac, described by a planet contrary to the order of the signs.

ARCA, in conchology, a genus of bivalves, whose animal is supposed to be a tethys: the valves are equal; and the hinges are beset with sharp teeth.

ARCADE, in architecture, an opening in the wall of a building, forming an arch.

ARCH, in architecture, a concave building, with a mould in the form of a curve.

ARCHBISHOP, a dignitary of the church of the first rank: instituted A. D. [illegible] There are two in England, the principal of which is the archbishop of Canterbury.

ARCHDEACON, an ecclesiastical officer having a peculiar jurisdiction and court, immediately under the bishop by whom he is appointed.

ARCHED *legs*, a fault in a horse, when his knees are bent in the form of an arch.

ARCHERY, the art of shooting with a bow and arrow. The English were always famous for their skill in archery, which was greatly encouraged by various monarchs. In the reign of Edward IV. an act was made that every man should have a bow of his own height made of yew, hazel, ash, &c. and mounds of earth were ordered to be made in every township for the inhabitants to practise archery. These were called *butts*, or *butt-gardens*. Another statute was made in the reign of Hen. VIII. commanding every father to provide a bow and two arrows for his son when seven years old

ARCHES, (*court of*,) the supreme court belonging to the archbishop of Canterbury, to which appeals lie from all the other courts within his province.

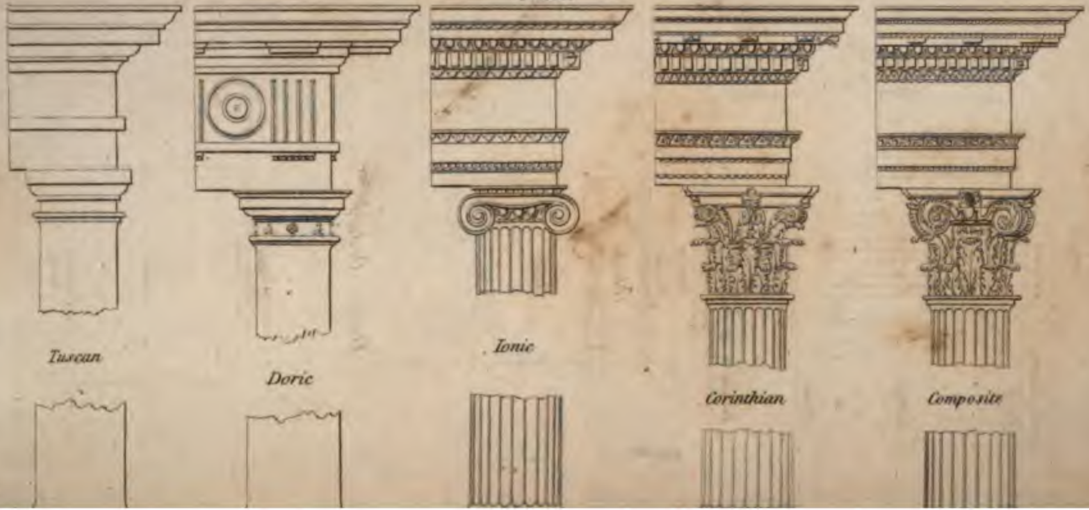
ARCHIL, a grey moss which grows on the rocks in the Archipelago, and on the western coast of England. It yields a purple dye but fleeting, and is named the litmus. By the help of tin it becomes durable, and approaches to scarlet. It readily yields to water or spirit.

ARCHILOCHIAN, a kind of verses invented by Archilochus, consisting of seven feet, the first four of which are usually dactyls, but sometimes spondees, and the three last trochees.

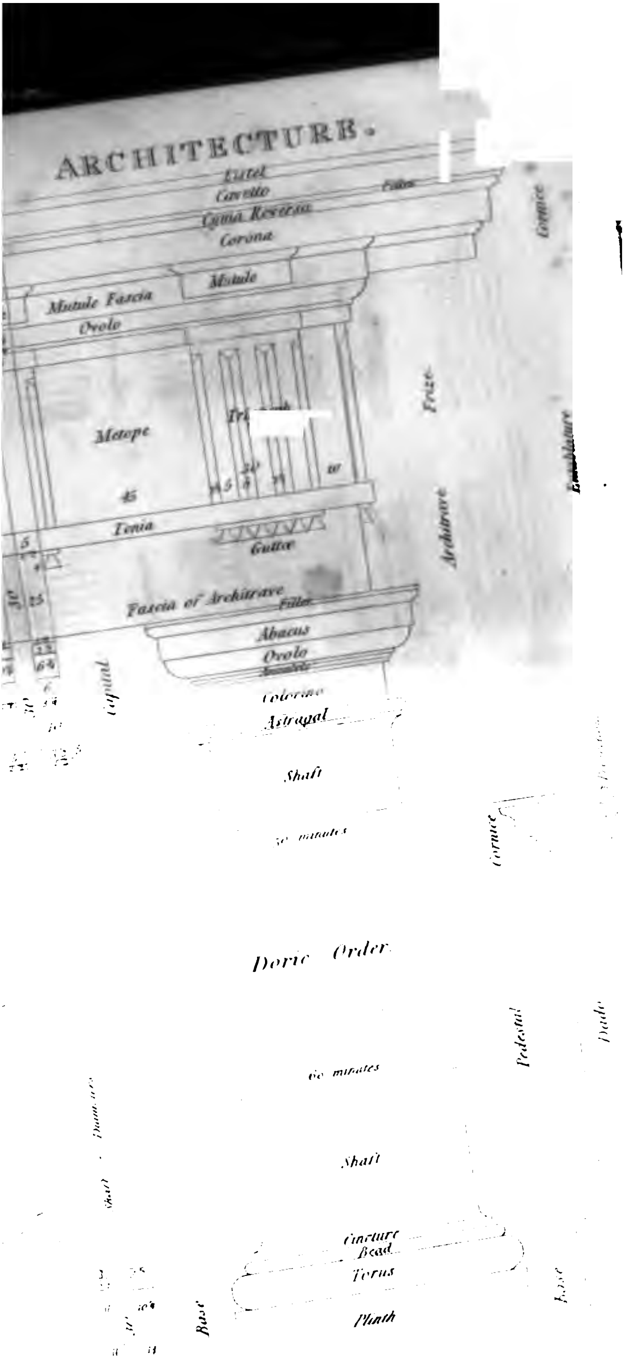
ARCHITECT, one who professes the art of building, and whose principal business is to design the work, and to see the whole of his plan properly carried into execution. He should to this end have a good knowledge of the qualities of the

ARCHITECTURE.

Orders



ARCHITECTURE.



Doric Order.

: first regular works of ar-
erected in that country.
wever, claim the honour
gance and symmetry with
venience in building. By
mans were the five orders
fection. These are the
ric, the Ionic, the Corin-
omposite; and though the
greatly improved the ge-
and internal convenience
thing has been added to
d symmetry of these co-

ie *Tuscan Order.*

s its name and origin in
was first inhabited by a
ia, whence it is likely the
Doric simplified. On ac-
ng and massy proportions,
alled the rustic order, and
n edifices of that charac-
portions are as follow:—
t of the column into five
of which is for the height
; and the remaining four
aft, capital, and entabla-
ole height being divided
parts, one is for the enta-
remaining four being di-
equal parts, one is for
neter of the shaft. Take
the base, including the
same for the height of the
e of the astragal. Divide
eter into 60 equal parts,
minutes, and by which
of the column are pro-
r heghts and projections.
rding to some, is half a
ers extend it properly to

Doric Order.

d its origin to the Dorians,
eece. Its character is
and of masculine ap-

inue better.

The Ionic Order.

This order is ascribed by Vitruvius to Ion above-mentioned, but it seems with more probability to have derived its origin from the people of Ionia, and to have been employed in the temple of Diana at Ephesus. The Ionic column is more slender than the Doric, but more graceful. Its ornaments are elegant, and in a style between the richness of the Corinthian, and the plainness of the Tuscan. The general appearance of it is simple, yet graceful and majestic, whence figuratively it has been compared to a female, rather decently than richly clad, whose locks of hair decorated with flowers, are represented by the volutes of the capital ornamented with festoons. When Hermogenes built the celebrated temple of Bacchus at Teos, he rejected the Doric after the marbles had been prepared, and adopted the Ionic in its stead. And indeed the difficulties of adjusting the mutules, metope, and triglyphs in Doric buildings, together with the heavy appearance of that order, naturally would cause the Ionic to be preferred. Denteles, which are peculiar to this order, represent the assers or small rafters that support the tiles: on the antient Ionic columns, the volutes are usually placed parallel, and to Michael Angelo is ascribed the executing them on an angular plan, though it is certain that some remains of antiquity furnish similar examples. The modern proportions are: eighteen modules for the height of the column, and four modules or four and a half for the entablature. The capital is twenty-one minutes, and the base thirty minutes in height; the shaft may be plain, or fluted with twenty or twenty-four flutings, whose plan should be a little more than a semi-circle, and the breadth of the fillet between them, one third of the flute. The ornaments of the capital should cor-most perfect model of the Corinthian order is generally allowed to be in the three columns in the Campo Vaccino at Rome, the remains of the temple of Jupiter Stator. The base of the column may be Attic or Corinthian, and the entablature was much enriched by the antients, who introduced in the frize representations of groupes of figures. When the entablature is thus ornamented, the columns are fluted. In most of the remains at Rome, the capital of this order is decorated with olive leaves. The modern proportions of this order are: the columns twenty modules in height; the entablature five modules; the base one module, the capital is seventy minutes in height, and the proportion of the members in the entablature is the same as in the Tuscan and Ionic orders. The entablature may be reduced to two-ninths, or one-fifth of the height of the column, and then it will be but to adopt the Ionic entablature, or to reduce the denteles of the cornice.

Of the Composite Order.

This order was invented by the Romans, and as its name imports, is a composition partaking of the Ionic and Corinthian orders, but principally of the latter, particularly in the leaves of the capital. Though the Composite order is usually placed last, as being the last invented, some architects of great name, particularly Scamozzi and Sir William Chambers, give it the fourth place, on the ground that the orders should succeed each other, according to their degrees of strength, and in the progression that must be observed when they are employed together.

In the Composite order, the height of the column is twenty modules, and that of the entablature five modules, the capital is seventy minutes in height. The base is of the same proportion as the Doric and Ionic orders, and as the module is less, all its parts will be more delicate. The shaft may be fluted as the Corinthian, and the principal members of the entablature may have the same proportions as the two former orders

Of the several Parts and Members of an entire Order.

The principal parts are three: the pedestal, shaft, and entablature. These principal parts are subdivided again into the plinth, the dado, and the cornice. The column includes a base, a shaft, and a capital. The entablature consists of an architrave, a frieze, and a cornice. The *plinth* is so called from a brick or flat square stone, on which columns originally were placed The *dado* or *dye* is so called from being of the form of a cube. The *cornice* is from coronis, a top, or summit. The *base* of the column is from βασισα a foundation. The *shaft* is that straight part of a column, comprehended between the base and capital, resembling a pillar. The *capital* from κεφαλη *caput*, the head. The architrave from αρχος the chief or principal, and *trabs* a beam, on account of its being the principal support to the entablature. The *frize* is so named from φιζιον a border or fringe.

These nine principal parts of an entire order, the dado and shaft excepted, [illegible] composed of small members or mouldings whose names and uses are as follow:

1. The *fillet* means a thread or narrow bandage.

2. The *cyma recta* from κυματιον wave on account of its swelling and [illegible]

3. The *cyma reversa*, the preceding member inverted.

4. The *corona*, or crown, is the principal member of the cornice, and shelters the smaller members of the entablature

5. The *ovolo*, from ovum an egg, because the antients carved this member in that form.

6. The *cavetto* from *cavus*, hollow.

7. *Capital* or upper fillet of the triglyph.

8. *Triglyph* or three engravings, in conformity to which name, it has two [illegible] channels, and two half ones, with [illegible] spaces between.

9. The *metope* is the space between one aperture and another; the triglyphs being supposed to be joints that fill the apertures, therefore the space between the triglyphs is termed the metope.

10. The *frize* is already explained.

11. The band the same as the fillet.

12. The *drops* or *guttæ* are conical

13. The *architrave* as above.

14. The *facia* or face, of which there are two or three in the architrave.

15. The *abacus*, for which see the word.

16. The *ovolo* of the capital, or the basket round which grew the acanthus.

17. The *annulets*, rings, or fillets which encompass the capitals.

18. *Colorino*, the collar or neck of the capital.

19. The *astragal*, from [illegible] that curvature of the heel, which this member resembles. The hollow which follows is named the apophyge.

21. The *scotia* or darkness, because of the shadow produced by its concavity.

20 and 22. The upper and lower [illegible] from τορος a cable to which this member bears a resemblance.

In some of the Doric entablatures are *mutules*, from mutuli or modillions which are placed perpendicularly over each triglyph, and are of the same width, and whose projection in the corona is the same, forming a square. In others are dentils, from the teeth which they represent, and the flat member on which they are placed is termed *denticulus*. The capitals of the Ionic, Corinthian, and Composite, have each of them *volutes*, so called from [illegible] *vendo*, to roll round. By some they are called the horns of the capital, from their resembling ram's horns.

An assemblage of the essential parts and mouldings is termed a profile, and the most perfect profiles are those composed of few mouldings, varied in form and size, so disposed that the straight and curved ones succeed each other alternately. When ornaments are employed in mouldings, some of them should [illegible] plain to give a proper repose.

Each order has a particular base. Tuscan has only a torus and a plinth Doric has an astragal more than the

being divided into six
, take five and a half for
the top. Columns from
feet are diminished one
hirty to forty feet, the low-
g divided into seven parts
nd a half may be taken for
neter; and from forty to
diminution may be one

s of Columns and the inter-
iation of the Orders.

ies of buildings according
on of the columns, are the
ich is thick of columns, and
the intercolumniation is one
a half of the column. The
mns wider apart, and the
on two diameters; the di-
ler and three diameters
lumniation; the araeos-
nt than it should be, its in-
four diameters; lastly
h columns at a proper dis-
intercolumniation two dia-
uarter, except the middle
ve three.

generally preferred the
their Tuscan works they
equal to four and some-
neters, which intercolum-
missible in this order, since
was usually made of tim-
other parts of the entabla-
stone. In structures buil't
e, they used a shorter in-
reeable to the length of
arble and to the greatness
hey supported; for which
style and eustyle modes
es applied to this order.
have adopted these two
l rule, and apply them to
ept the Doric. But the ara-

they need not project above one-eighth of their diameter.

Attics. These had their origin at Athens where it was a rule to conceal the roofs of buildings. A line of low columns and pedestals, or of columns and pilasters may be employed for this purpose. They should be less in height than one third of the order on which they are placed, but not lower than one quarter. If the attic is composed of a low order, the base and cornice may have the same mouldings as the pedestals of the columns, and with the dye, bear the same proportion to each other. When they form pilasters over the columns of the building, the breadth of the bases must not be more than the diameter of the columns.

Caryatides. Those representations of the human figure which support entablatures, are called Caryatides, Persians or Termini. The former were invented by the Athenians to commemorate the captivity of the Carians and Persians. The figures of the Caryatides are female and the Persians males. The Termini are used to support monuments, chimney pieces, and take their names from the boundary stones of the antients.

Of Gothic Architecture.

Having spoken of the regular orders of architecture, it is necessary to say something on that which has been called *Gothic.* On the decline of this art among the Romans, and when the empire was overrun by the Goths, these ravagers introduced their own mode of building. Like the antient Egyptians they appear to have paid more regard for magnitude than regularity. However they corrected themselves in some degree by the Roman models, though they had not taste or genius to make a proper choice, or to create any improvement. The antient buildings seems to be no ground for making a distinction between Saxon and Norman architecture. The antient parts of most of our cathedrals are of this work, the characteristics of which are these: the walls are very thick, generally without buttresses; the arches are semi-circular, and supported by clumsy columns with a base and capital. The capitals were adorned with carvings of foliage and animals; and the columns had small half columns joined to them, the surfaces being ornamented with spirals, squares, network and figures in relievo. The marks of the Saracenic architecture are its numerous and prominent buttresses, its lofty spires and pinnacles, its large and ramified windows, its ornamental niches and canopies, the sculptured saints and angels, and an indiscriminate profusion of ornaments. But its most distinguishing characteristics are the small clustered pillars and pointed arches formed by the segments of two intersecting circles. This style of architecture is supposed to be of Arabian origin, and to have been introduced into Europe by the crusaders; or by those who made pilgrimages to the holy land. In the reign of Henry III. it gained so complete a footing here, that many of the old buildings were pulled down to give place to new ones on this model. The cathedral of Salisbury was begun early in this reign, and finished in 1258. In Sir Christopher Wren's opinion, it is one of the finest productions of antient architecture in this island. From this period till Henry VIII. the pillars in churches were of Purbeck marble, slender and round, encompassed with shafts a little detached, each having a capital adorned with foliage forming one elegant capital for the whole pillar. The windows were long and narrow with pointed arches and painted glass. In the 14th century, the pillars instead of being detached were united; and the windows, especially those at the east and west ends, were large and divided by stone mullions ramified above and forming numerous compartments of various figures. In the reign of Henry VII. a new kind of low pointed arch was adopted described from four centres, round at the branches and the angle obtus eat the top.

From this time Gothic architecture began to decline, and was succeeded by a mixed style, in which the Grecian and Gothic were jumbled together. In the 16th and 17th centuries the chaste architecture of the Greeks and Romans revived. The first improvements were in Italy from whence they passed into most other parts of Europe, and though the Italians were for a considerable period accounted the first architects, this country produced men who successfully rivalled them, particularly Inigo Jones and Sir Christopher Wren.

Of Practical Architecture. Having fixed on a proper situation, which is a consideration of primary importance, a plan must be made with the necessary elevations. In the choice of materials regard must be had to the circumstances of the place. Where stone is in plenty it will be preferred in building a stately edifice. The *circular form of building* is strongest, but

it does not admit
bution of light; nor
A rectangular, th
square figure is use
rectangular building
to exceed the bread

Mixed figures, inc
variety, are best ada
and a centre and pri
is the most elegant
When houses are p
room is taken up
difficult to supply t
ladio advises that
foundation should b
of the height of the
the first course of s
be laid at least twic
wall, and on an hor
surface. If the buil
their foundations m
principal one. If t
marshy, you must d
which is solid; and
put pieces of oak
which the wall is to
feet apart, and ha
them down. spike
about four inches wi
the wall. Should t
piles must be drive
faulty only here and
turned over the ba
ground for building
most labour in digg
its consistency when
that the first cours
should be laid clo
when there is timbe
as the mortar is apt to
should be of sound m
having the heaviest
and they must be gr
they ascend. Parti
sary to make the an
be done in brick hou
corners of squared
joined with others at
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about two feet, at th
twenty feet, which w
more firm. In buil
should be laid in sum
winter as dry as pos
laid point and joint
as may be, that the
blended together.
raise a wall above ei
the adjoining one b
The front and party
wrought up together
Walls are less solid
mortar are too large.
walls the first are do
should be but few, a
four feet and a half in
sized buildings. Dou
in preserving the t
house and excluding
mode of uniting, wh
more rooms into on
the folding doors wh
a great improvement,
houses. The hall or
ways have a fire-pl
nected with the sta
produced will be
the whole house. Of

rail is a great improve-
n to stairs, as well as
k by which it is sup-
nd quadruple winding
onstructed of late years;
ay go up and down
er without meeting.
placing a bed-chamber
together, with a door
nd each room having a
ge, is preferable to the
g the lodging rooms so
rs were opened, a view
he whole house.
ooms should be so dis-
sily converted into one
ing of folding doors, but
t is not necessary for
country mansions the
as near the dining apart-
ent; care being taken
ccasioned there do not
e superior parts of the
ouses the kitchen must
rlour floor, and to pre
ce of the smell caused
nnel like the kitchen
carried up in the stack
d next to that of the
nnel must have its open-
ceiling of the kitchen;
e charged with the va-
cing will then pass off
The improvement of
t iron, or pipes bent
orm an elbow, which
the last fluid thrown
prevents the ascent of
n this principle the wa-
en invented, which are
at perfection. The o-
ith the kitchen should

jambs should be bevelled off on the inside, for the more full distribution of light. Lofty windows descending nearly to the floor are the most agreeable and airy, and balconies railed with cast iron, are a great ornament. Sky-lights in our climate are productive of many inconveniences, and waste the heat generated in the house considerably, besides admitting damp, rain, and snow. They ought not to be admitted except for stairs and halls. When necessary their apertures through the roof should spread as much as possible in the descent, that the rays of light may not be confined from spreading.

The length of a well proportioned room should be equal to the breadth and a half; and if there be a third story, divide the height of the second into twelve equal parts, of which take nine for the height of the rooms. The length of galleries may be five times their breadth; and should rarely exceed eight times the width.

The pitch of a roof is regulated by the climate, and the materials made use of to defend the timbers from the weather. Roofs covered with lead may be nearly flat; but this method is seldom used. For tiles a roof must be higher than the pediment pitch, which is one fourth of the entire building. But this pitch is hardly high enough for slates. Copper coverings have recently been adopted, and may be laid on roofs of a low pitch.

ARCHITRAVE, in architecture, that part of a column or order of columns immediately above the capital, and the lowest member of the entablature. Over a chimney it is called the mantle-piece; and over doors or windows the hyperthyron.

ARCHON, the chief magistrate of Athens form, with large roundish heads, small mouths, ears short, and sometimes none, a short tail. They feed on roots, grain, &c. which they often collect into heaps. They reside in burrows, and sleep during the winter. There are 8 species: 1. Marmot Alpine is a native of the Alps and Pyrenean mountains, and feeds on roots, plants, insects, &c. It is longer than a rabbit, and of a brownish or tawny ash colour; the head is large and flat; the ears short and hid in fur, the tail thick and bushy. It is found only on the tops of high mountains; where numbers of them unite in preparing one large habitation. They delight to bask in the sunshine, and frequently are seen in an upright posture, sitting on their hind feet. When thus assembled, one acts as a centinel, who, on the appearance of danger, gives a whistle, on which the whole body hastens into the cavern. As soon as winter commences, they close the entrance to their habitation, and gradually fall into a state of torpidity till the spring. They breed early in the summer, and the litter is usually three or four. 2. Marmot monux, is a native of North America, and the Bahama islands. It resembles the preceding, and the colour is of a ferruginous brown above, and whitish beneath. The tail is longer than in the rest of the species. 3. Marmot Quebec is frequent in Hudson's Bay and Canada. Its colour is brown above undulated with whitish or pale grey, the legs and under parts of the body are ferruginous, the face dusky, and the tail short. 4. Arctomys bobac is of the size of the Alpine marmot, and abounds in Poland and Russia, among the Carpathian hills. It is grey above and ferruginous beneath, the tail is short. In its manners it resembles the first species. The holes of these animals are lined with hay. They are mild and gentle, and easily domesticated. 5. Arctomys precinosa, or hoary marmot, is of an ash colour, and the hair long and coarse. It is a native of North America. 6. Arctomys Maulina inhabits the province of Maull in Chili. It is twice as large as the Alpine marmot, and nearly of the same colour, but has pointed ears, long nose, four rows of whiskers, and a longer tail than the common marmot. It is very strong, and a match for dogs. 7. Arctomys guudi, is a native of Barbary, and is of the size of a small rabbit, of a testaceous red colour, the ears are sinucated with large apertures, the tail short. 8. Arctomys citillus, or variegated marmot. This is the most elegant of all the species. In its appearance it exhibits a beautiful variegation of yellowish brown, and white. Its general length is about a foot, and of the tail four inches and a half. It inhabits Bohemia, Austria, Hungary, Tartary, and America. It is sometimes found in woods, but chiefly delights in dry hilly places. These animals form subterraneous burrows, in which they deposit grain, nuts, &c. for their winter food; it is not certain that they sleep during that period.

ARCTOPUS, in botany, a genus of plants of the polygamia diœcia class and order, *and in the natural method, ranking under the 45th order*, umbellatæ. The umbella of

the male is compound; the
consists of five leaves; the
five petals, the stamina are fiv
pistilli; the umbella of the her
is simple, the involucrum is
four parts, spinous, large, a
many male flowers in the dis
species is the Arctopus echin
is a native of Ethiopia.

ARCTOTIS, in botany, a
polygamia necessaria order,
nesia class, ranking in the
thod under the 49th order,
discortes. The receptacle is
corona of the pappus is pen
and the calyx imbricated with
at the top. There are 11 speci
of Ethiopia and the Cape of
Of these: 1. Arctotis angust
spear-shaped leaves. 2. Arcto
with wing-shaped woolly leave
remarkable for their beauty.
green-house plants with us.

ARCTURUS, a fixed star of
magnitude, in the skirt of Bootes.

ARCUATION, in gardening,
of trees by layers, the method of
this: strong mother plants must
a clean border, and when they
five or six main branches from
and as many collateral branches,
ones must be bent to the ground,
which, some cut them half thro
fasten them down with pegs. T
branches must be covered
thick in the joints, and have a la
of earth made round them to
water.

ARDEA, the heron, a genus of
the order of grallæ. The bill
sharp, long, and compressed,
row from the nostrils to the
nostrils are linear, and the feet
toes. Linnæus places under th
the grus or crane, the ciconia or
the ardea or heron. Of the
the most remarkable are: 1. Ar
ticana, or hooping crane of
is a native of America. The cro
head and the neck are naked
lous, the forehead, nape of the
prime wing feathers black, but
white. They lay two eggs, and
2. Ardea argil, or hurgil of
enormous bi[illegible] the feathers of
and wings are of an iron colour,
belly a great deal of dirty white
inhabits Bengal. 3. Ardea ci
white stork of Ray, has naked
and black prime wing feathers,
below the feathers, and the beak
claws are red. It is a native of
Asia, and Africa; feeds on ani
serpents. In Holland, storks wal
being molested about the stree
are birds of passage. 4. Ardea
or egret is crested behind, the bo
the beak black, and the feet of a
colour. Its length is 24 inches, a
end of the legs 32. It is a native
but was formerly common in th
5. Ardea grus, or common cra
naked papillous crown; the pri
feathers are black, and the body
colour. This species abounds
and Asia, flying in great flocks. T
on all kinds of reptiles, and on gr

a black belt on the neck
a native of Europe. It
d sometimes on cliffs on
lcon hawking was for-
ersion with our ancestors.
0 years. 9. Ardea pa-
ned crane, has an erect
h the temples and two
It is a native of Guinea,
tame. 10. Ardea stel-
ris, has a smooth head,
potted with different co-
tive of Europe, and in-
tures. It flies chiefly in
ries by a spiral ascent,
it. The food of the bit-
ly frogs, and sometimes
s somewhat like that of
dea violacea, or crested
, has a white crest, the
white, and bluish below.
na and the Bahama is-
called the crab-catcher.
has a straight greenish
ides. The crown of the
ed, the rest of the head,
the under parts to the
e under part from the
ack of a bluish ash co-
ite feathers springs out

botany, a genus of the
gynia class and order.
ed; stigma, bifid; berry
olitary. The only spe-
the Cape of Good Hope.
n-house plant.
etry, is the superficial
re; thus in a parallelo-
, and four in breadth,
24 square feet.

into cordage. What is called the cabbage, grows under the large leaves or branches which surround the top of the trunk just above the beginning of the green bark. It lies in thin, white, flakes, and in taste resembles the almond, but sweeter. This substance is boiled and eaten by the inhabitants of the West Indies. The cabbage flower grows from that part of the tree where the ash colour ends. Its first appearance is green, and grows to above 20 inches long, and about four broad. While this is young it contains a fine yellow seed, dispersed among filaments, which are pickled and sent to Europe. If the spatha containing this seed is suffered to become ripe, it will produce a number of berries, about the size of coffee, which being planted, grow into cabbage trees. The inside of the young footstalks, it is said, will make writing paper; the trunks of the trees serve for gutters; the pith makes a kind of sago, and the nuts yield an oil. 3. Areca oryzœformis is a native of Cochin China, Amboyna, &c. It is a slender palm tree, and the fruit is chewed with the betel, as the first species.

ARENA, among the Romans, was a place where the gladiators fought; and was so called from being strewed with sand.

ARENA, in architecture, is the middle or body of a temple.

ARENARIA, in ornithology, the turnstone or sea dotterel; also a species of tringa, which inhabits the sandy coasts of Europe and the Caspian sea.

ARENARIA, in botany, *sandwort*; a genus of the decandria trigynia class, ranking in the natural method under the 22d order caryophyllæ. The calyx has five leaves; petals five; capsula unilocular

ARETHUSA, in botany, a genus of the gynandria diandria class, and ranking in the natural method under the 7th order, orchideæ. There are seven species, all natives of America. The nectarium is tubular, at the bottom of the corolla, and the inferior labium fixed to the stylus.

ARETIA, in botany, a genus of the pentandria monogynia class; and in the natural method, ranking under the 21st order, pretiæ. Corolla in five parts: tube ovated; capsule globular, and one celled. There are three species.

ARGEMONE, *prickly poppy*, a genus of the monogynia order, and polyandria class of plants; in the natural method, ranking under the 27th order rhæadeæ. Corolla six petalled: calyx tryphillous; and capsule semivalved. There are three species, one of which is common in the West Indies, and is called the devil's fig.

ARGENT, in heraldry, the white colour in coats of ordinary arms; in those of princes it is called luna; in the nobility pearl; and in engraving is denoted by leaving the part plain.

ARGENTINA, a genus of abdominal fishes: the generic characters of which are these: the teeth are in the tongue as well as the jaws; the branchiostege membrane has eight radii; and the belly fins consist of many rays. There are two species: 1. Argentina Carolina, which is found in the fresh waters of Carolina. 2. Argentina sphyræna. Of the air bladder of this species, false pearls are sometimes made.

ARGENTUM ARBORESCENS, the separation of silver by mercury, called also arbor dianæ. It is thus performed: mix six parts of a solution of silver, and four of a solution of mercury, both made with nitric acid, and completely saturated: add thereto a little distilled water, and put the mixture into a conical vessel, already containing six parts of an alloy made in proportion of seven parts of mercury to one of silver. In a few hours there will be formed a beautiful tree.

ARGENTUM, *musivum*, a mass, consisting of silver-like flakes, used for the colouring of plaster figures. It consists of an amalgam of equal parts of tin, bismuth, and mercury, mixed with white of egg, or spirit of varnish.

ARGILLA, see *Clay*.

ARGO, in astronomy, a southern constellation of fixed stars, the number of which in Ptolemy's catalogue is 8, in Tycho's 11, and in the Britannic 25. It is so called from the Argo or vessel in which the Argonauts went in search of the golden fleece.

ARGONAUTA, a genus of shell fish, of the order of vermes testacea. The shell consists of one special involuted valve. There are two species, the most remarkable of which is the argonauta argo, or nautilus. It is a native of the Mediterranean and Indian seas, and is the Nautilus of English collectors. When it intends to sail, it discharges a quantity of water, and rising to the surface, erects its arms, between which a membrane is expanded, by means of which it is driven before the wind; at the same time its two arms which hang over the side of the shell, answer the purpose of oars. In this manner it sails in fine weather;
approach of a storm, it lo
draws in its arms, takes i
sinks to the bottom.

ARGOPHYLLUM, in b
leaf; a genus of the mon
and pentandria class of plan
sule is bilocular; nectarium
pentagonous and the same
corolla. The only species
phyllum nitidum, or the glo
lum, which is a native of Ne
It resembles the ivy.

ARGUMENT, in logic and
inference drawn from ind
highly probable premises.
argument means a known a
another is sought which is un
argument of the moon's la
distance from the node, an
clination is an arch of a p
intercepted between the as
and the planet's place from
cording to the order of th
menstrual argument of lat
distance of the moon's tru
the sun's true place; by whi
ty of obscuration in eclipses
nual argument of the moo
the distance of the sun's pl
place of the moon's apogee
of the ecliptic, contained b
two places.

ARGUS-SHELL, a species
shell, spotted somewhat like
tail.

ARGYTHAMINA, in bot
of plants of the class and or
ecia tetandria; the characte
calyx four leaved, corolla f
female calyx five leaved, c
stylus diachotomus, capsul
seeds solitary. It is a shrub,
tive of Jamaica.

ARIDULLAM, in natural
of zarnich, found in the Eas

ARIES, in zoology, see *R*
my Aries is one of the conste
northern hemisphere, and
signs of the zodiac. It is t
twelfth part of the ecliptic,
enters about the 20th of
stars in this constellation are
Ptolemy, 18; Tycho, 21;
and Flamstead, 66.

ARILLUS, in botany, the
vering or coat of the seed,
dry falls off spontaneously.

ARIST, a measure, of len
about 38 inches.

ARISTA, in botany, a long
like a needle, which project
of corn, grass, &c.

ARISTEA, in botany, a
triandria monogynia class and
essential character is petals
clinata, stigma funnel-shaped
sule inferior, many seeded.
species which is a native of
Good Hope.

ARISTIDA, in botany, a
class and order triandria d
essential character is, calyx
corolla one valved, with th
awns. There are six spec
the East and West Indies.

ARISTOCRACY, a form o
where the supreme power

f persons of the

-wort, a genus
and gynandria
atural method
r sarmentaceæ.
entire petal;
are 21 species,
1. Aristolochia
maica. It has
h climb on the
o a considera-
ow in clusters
r. 2. Aristolo-
ve of Virginia
radix serpen-
n The leaves
hort foot-stalks
round capsule
s ull of seeds.
ens The com-
ried is 6d. per
sually gather-
ing hours. 3.
e root of this
, and it is ac-
lignant fevers,
substance the
nd in infusions

ly, the system
followers, also
ophy.
e of numbers,
a. The origin
. The Greeks
s of the alpha-
nbers and the
method, which
chapters, ex-
umerals were

C.
e hundred,
M.
ousand.
tters increases
s II. two, III.
placed a te.
values are ad-
one thousand
neral is placed
, the value of
a that of the
forty.
stead of D for
d ten times by

500
5000
50,000
1000
10,000 &c.
esented by a

5000, L̄ 50,000.
w in use was
Arabians, who
dians.
arithmetic are
f Euclid's Ele-
agorean phi-
n this science,
in 1538. The
the celebrated
, supposed to
machus.

The first regular writer on decimals was Simon Stevinus, about 1582, and from that period the authors and improvements on this science are too numerous to mention.

NOTATION and NUMERATION.

There does not seem to be any number actually adapted to constitute a class of the lowest or any higher rank to the exclusion of others. But as ten has been universally adopted for this purpose, it is probably the best for general use. All numbers are represented by these characters,

1,	2,	3,	4,	5,	6,	7,
one,	two,	three,	four,	five,	six,	seven,
8,	9,	0,				
eight,	nine,	cypher.				

The first nine are called significant figures, or digits. When several of them are placed together, the first figure is to be taken for its simple value; the second signifies so many tens, and the rest so many higher classes agreeable to the order in which they stand; and the cypher in any place denotes the want of a number in that place; thus 50 denotes five tens and no units.

The following table shews the names and divisions of the classes.

8. 4 3 7,9 8 2. 5 6 4,7 3 8. 9 7 2,6 4 5

8.	4	3	7,	9	8	2.	5	6	4,	7	3	8.	9	7	2,	6	4	5
Trillions	Hundred Thousand Billions	Ten Thousand Billions	Thousand Billions	Hundred Billions	Ten Billions	Billions	Hundred Thousand Millions	Ten Thousand Millions	Thousand Millions	Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Units

ADDITION,

Is that operation by which several numbers are collected into one total sum.

Rule. Write the units under units, tens under tens, and so on in regular order; then reckon the amount of the right hand column. If under ten put it down, if it exceed ten mark down the units only and carry the tens to the next column. Thus,

$$\begin{array}{r} 5678 \\ 4325 \\ 7890 \\ \hline 17893 \end{array}$$

The best way of proving the truth of addition is to add up the lines in a contrary direction; thus, if I begin at the bottom, when the whole is cast up, I do the same from the top.

Compound Addition, teacheth how to add several numbers of different denominations into one total.

Rule. Place the numbers of the same denomination exactly under each other;

then add up the figures in the lowest denomination, and find how many ones of the next higher denomination are contained in the sum; lastly write down the remainder and carry the ones to the next denomination, proceeding in the same manner through all the denominations. The method of proof is the same as in common addition.

Examples.

£.	s.	d.
476	19	7¼
3?9	14	10¼
765	18	11¾
1572	13	5½

Troy weight.

lb.	oz.	dwts.	grs.
54	9	17	15
97	8	15	7
41	3	19	23
193	10	12	21

Avoirdupoise.

Tons	cwt.	qrs.	lb.
4	16	3	0
1	14	2	24
3	17	0	26
10	9	0	2

And in like manner with measures, regard being had to the tables.

SUBTRACTION,

Is that by which we take a less number from a greater and find the difference.

Rule. Subtract units from units, tens from tens, and so on; and if any figure of the less number be greater than the other, add one to the next figure, which is called borrowing ten.

Examples.

4582	7948059
2621	4256328
1961	3691731

The method of proving is by adding the difference to the lesser number, and if the sum is equal to the greater, the process is right.

Rule for compound Subtraction. Place like denominations under their like, and borrow when necessary, according to the value of the next higher denomination.

Ex.

£.	s.	d.
95	7	6¼
59	16	9½
35	10	8¾

lb.	oz.	dwts.	grs.
45	8	14	15
29	8	17	17
15	11	16	22

MULTIPLICATION,

Is a compendious method of addition, and shews how to find the amount of a number, by repeating it several times.

Thus 8 multiplied by 5, or 5 times 8 is 40. The given numbers 8 and 5 are named factors; the first, 8, is called the multiplicand, the second, 5, the multiplier, and the amount 40, the product.

Ex. 76859 mult. by 4, or

76859	76859
4	76859
	76859
	76859
307436	307436

If the multiplier be 10, a cypher is to be annexed to the multiplicand; and if 100, two cyphers, and so on.

Rule. Place the multiplier under the *multiplicand*, and multiply the latter by the *significant figures* of the former; placing *the right hand figure* of each product under the figure of the multiplier fro arises, then add the product.

Example.

93956
8704
375824
6576920
751648
817793024

A number which cannot be by the multiplication of two othe a prime number, as 3, 5, 7, 11.

A number that may be produ multiplication of two or more s is called a composite number arises from the multiplication which numbers are called the c parts of 27.

If the multiplier be a compos we may multiply successively b ponent parts.

Ex. 7638 by 45, or 5 times

45
38190
30552
343710

If the multiplier be 5 which we may annex a cypher and If 25 which is the fourth part may annex two cyphers and a 4.—To multiply by 9 which is 10, we may annex a cypher, a the multiplicand from the num poses.

Multiplication is proved by the operation, using the mul the multiplicand, and the mult the multiplier; or it may be do ing out the nines of the multipl multiplier and setting down th ders, which multiply together, excess of nines in the product the excess of nines in the total the work is right. But the best by division.

Compound Multiplication te find the amount of a number o denominations, by repeating it a number of times.

Rule. Place the multiplier lowest denomination of the mu multiply the number of the lowe nation and so on through the product through the several ex be the amount. Thus,

	s.	d
9*lb.* of tobacco at	4	8
the answer £.2	2	4

If the multiplier exceed 12 successively by its component p

	£.	s.	d.
Ex. 16 *cwt.* of cheese at	1	18	8
			4
	7	14	8
			4
	£.30	18	8

If the multiplier cannot be by the multiplication of sma find the nearest to it, then m the component parts as abov or subtract for the odd ones a

s. d.
ls of Holland at 7 8½ per ell.
4

1 10 10
4

6 3 4
7 8½

6 11 0½

DIVISION.

to find how often one number
d in another of the same deno-
the number to be divided is
dividend, and that by which
tion is performed, the divisor.
ber of times the divisor is con-
the dividend is named the quo-

lividend contains the divisor
ber of times and some parts
last are called the remainder.
rite the divisor on the left hand
dend, and the quotient on the
d how many times the divisor
d in as many figures of the di-
are just necessary, and place
r in the quotient; multiply the
the quotient figure and set the
der that part of the dividend
subtract the last product from
the dividend under which it
to the right hand of the re-
ring the next figure of the
which number divide in the
r till the work is completed.
divisor is not more than 12,
n may be performed with-
down any figures but the quo-

47034128(35586176
divisor is a composite number
vide successively by the com-
s. Thus,

30114 by 63
9)30114

7)3346

478 quotient.

re are cyphers annexed to the
them off, together with an
ber of figures from the divi-
xing these figures to the re-

2,00)3786,43(72 4243/5.00
364

146
104

4243

d Division, teaches to find how
given number is contained in an-
ifferent denominations.
lace the numbers as above; be-
left hand and divide each deno-
by the divisor, setting the quo-
der their respective dividends;
e is a remainder after dividing
denominations except the least,
many of the next lower *denomi-*
*s equal to and add it to the num-*ber, then divide the sum as usual till the whole is completed.

£. s. d.
Ex. Divide 225 2 4 by 2

112 11 2

If the divisor exceed 12 divide regularly by its component parts.

Ex. What is cheese per cwt. if 16*cwt.* cost 30*l.* 18*s.* 8*d.*

4)30 18 8

4) 7 14 8

1 18 8 the answer.

If the divisor cannot be produced by the multiplication of small numbers, divide by it as in long division.

£. s. d.
Ex. 17)74 13 6(4*l.* 7*s.* 10*d.*
68

6
20

133
119

14
12

174
170

4

REDUCTION.

Teaches to bring numbers from one name or denomination to another of the same value.

Rule. All great names are brought into smaller by multiplying with as many of the next less as make one of the greater, adding to the product the parts of the less name, if the number to be reduced is a compound; and all small ones are brought into greater by dividing as many of the less as make one of the greater.

£. s. d.
Ex. Reduce 255 6 9 into pence.
20

5106
12

61281 the number required.

Query. How many pounds are there in 122562 pence?

12)122562

2,0) 1021,3—6

£.510 13 6

THE RULE OF THREE DIRECT.

Teacheth, by having three numbers given how to find a fourth, in the proportion to the third as the second is to the first.

Rule. Place the numbers so that the first and third may be the terms of supposition and demand, and the second of the same kind with the answer required; bring the first and third numbers into the same denomination and the second into the lowest name mentioned; multiply the second and third together, and divide the product by the first, and the quotient will be the fourth number in the same denomination as the second.

The method of proof is by inverting the question.

Ex. If 24*lbs.* of raisins cost 6*s.* 6*d.* what will 18 frails cost, each weighing 3*qrs.* 18*lbs.*?

lbs. *s.* *d.* *qrs.* *lbs.*
24 : 6 6 :: 18 frails each 3 18
12 28
—— ——
78 102
—— 18
——
1836
78
——
24)143208(5967 pence
—— or
£.24 17 3

This rule on account of its extensive utility is sometimes called the *Golden Rule of Proportion.* It is founded on this self-evident principle, that the magnitude or quantity of any effect varies in proportion to the varying part of the cause; thus, the quantity of goods bought is in proportion to the money laid out; the space gone over by an uniform motion is proportional to the time, &c.

THE RULE OF THREE INVERSE.

Teacheth by three numbers given to find a fourth that shall bear the same proportion to the second as the first has to the third. If *more* require *more*, or *less*, require *less*, it belongs to the preceding rule, but if more require less and the contrary, it belongs to the Rule of Three Inverse.

Rule. State and reduce the terms as before; multiply the first and second terms together, and divide the product by the third, and the quotient is the answer in the denomination of the second

Ex. What quantity of shalloon of three quarters of a yard wide will line seven yards and a half of cloth one yard and a half wide?

yd. *qrs.* *yds.* *qrs.* *qrs.* *yds.*
1 2 : 7 2 :: 3 : 15 the answer.

COMPOUND PROPORTION.

Teacheth to resolve such questions as require two or more statings by simple proportion, whether they be direct or inverse.

Rule. Put that term in the second place which is of the same denomination as the term sought; place the terms of supposition one above another in the first place; and those of demand in the third place; the first and third term of every row will be of one name, and must be reduced to the same denomination. Examine each row, by saying if the first term gives the second, does the third require more or less? If it require more mark the less extreme with a cross, but if less mark the greater extreme. Multiply those numbers together which are marked for a divisor, and those which are not marked for a dividend and the quotient will be the answer.

Note. When the same numbers are found in the divisor as in the dividend, they may be thrown out of both. Or any numbers may be divided by their greatest common divisor, and the quotients used instead of them.

Ex. If 16 horses can eat up 9 bushels of oats in 6 days, how many horses will eat up 24 bushels at the same rate?

+ 9 bushels : 16 horses :: 24 bushels −
6 days : ——— :: 7 days +

$$\frac{6\times16\times24}{9\times7},\text{ by contraction }=\frac{2\times16\times24}{\overset{1}{3}\times7}=$$

$$\frac{2\times16\times8}{1\times7}=\frac{256}{7}=36\frac{4}{7}\text{ horses.}$$

PRACTICE.

Is a contraction of the Rule of Three Direct, when the first term happens to be an unit, or one; and is an easy method of working most questions that occur in trade.

The method of proof is by the Rule of Three Direct.

An aliquot part of any number, is such a part of it, as being taken a certain number of times doth exactly make that number.

General Rule. 1. Suppose the price of the given quantity be 1*l.* or 1*s.* then will the quantity itself be the answer, at the stated price. 2. Divide the given price into aliquot parts; either of the supposed price or of any other, and the sum of the quotients of each will be the answer.

Ex. What is the value of 526 yards of cloth at 3*s.* 10½*d.* per yard?

s. *d.*		526						
3 4	is 1-sixth	87	13	4	ditto at	0	3	4
4	is 1-tenth	8	15	4	ditto at	0	0	4
2	is 1-half	4	7	8	ditto at	0	0	2
½	is 1-eighth	0	10	11½	ditto at	0	0	½
		101	7	3½	ditto at	0	3	10½

Ans. at 1*l.*

VULGAR FRACTIONS.

To understand the nature of Vulgar Fractions we must suppose 1 or unity divided into several equal parts, one or more of which is termed a *fraction*, and is represented by placing one number above a line and another under it; thus two fifth parts is written thus $\frac{2}{5}$: the number above the line is called the *numerator*, and the under one the *denominator*; the latter shews how many parts the unit is divided into, and the former how many of those parts are meant by the fraction.

When the numerator is increased the value of the fraction becomes greater; but when the denominator is increased the value is lessened.

A fraction annexed to an integer or whole number makes a mixed number,

e $5\frac{2}{3}$. A fraction whose nu-
greater than its denominator
an *improper fraction*, thus $\frac{17}{3}$
of this kind are greater than
xed numbers may be repre-
he form of improper fractions,
may be reduced to mixed num-
metimes to integers. A whole
ay be treated as a fraction by
denominator unity.
e mixed numbers to improper
multiply the integer by the
or of the fraction, and to the
d the numerator, and the sum
e numerator of the improper
and is placed above the given
tor.

$$5\frac{2}{3} = \frac{17}{3}$$

```
 5  integer
 3  denominator
--
15  product
 2  numerator given
--
17  numerator required.
--
```

e one is equal to two halves, or
ird parts, or four quarters, and
teger is equal to twice as many
&c. therefore every integer may
ssed in the form of an improper
having any assigned denomina-
e numerator is obtained by mul-
the integer into the denominator.
e reason of the rule is obvious;
duced to an improper fraction
enominator is 3 makes $\frac{15}{3}$ and this
$\frac{2}{3}$ will be $\frac{17}{3}$.

educe improper fractions to whole
d numbers, divide the numerator
denominator."

$$\frac{112}{17} = 6\frac{10}{17}.$$

```
)112(6 10/17
 102
 ---
  10
 ---
```

1. $\frac{3249}{10}$ 5. $\frac{365}{15}$
2. $\frac{342}{12}$ 6. $\frac{7394}{35}$
3. $\frac{7556}{27}$ 7. $\frac{8642}{93}$
4. $\frac{15764}{308}$ 8. $\frac{4362}{118}$

problem is the converse of the for-
nd proved the same way.
reduce fractions to lower terms,
both numerator and denominator
number which measures both,
ace the quotients in the form of a
n."

$$\frac{135}{360} = \frac{27}{72} = \frac{3}{8}.$$

135 and 360 are both measured by
the quotients form $\frac{27}{72}$ which is a
of the same value in lower
Again 27 and 72 are both measured by 9, and the quotients form $\frac{3}{8}$ of equal value and lower terms.

"To find the greatest common measure of two numbers; divide the greater by the less, and the divisor by the remainder continually till nothing remains; the last divisor is the greatest common measure.

Ex. Required the greatest number which measures 475 and 589.

```
                          475)589(1
                          ---
                          114)475(4
                              ---
The greatest common measure 19)114(6
                               ---
                                 0
                               ---
```

If there be no common measure greater than 1 the fraction is already in the lowest terms.

If the greatest common measure of 3 numbers be required, we find the greatest measure of the two first, and then the greatest measure of that number and the third, and so on for more numbers.

"To reduce fractions to others of equal value having the same denominator." 1st. Multiply the numerator of each fraction by all the denominators except its own; the products will be the numerators to the respective fractions sought. 2d. Multiply all the denominators into each other, and the product will be the common denominator.

Ex. $\frac{4}{5}$, and $\frac{7}{9}$, and $\frac{3}{8} = \frac{288}{360}$, and $\frac{280}{360}$, and $\frac{135}{360}$.

4 × 9 × 8 = 288 first numerator.
7 × 5 × 8 = 280 second numerator.
3 × 5 × 9 = 135 third numerator.
5 × 9 × 8 = 360 common denominator.

Addition of Vulgar Fractions.

Rule. Reduce them if necessary to a common denominator, over which place the sum of the numerators.

Ex. 1st. $\frac{3}{5} + \frac{2}{9} = \frac{27}{45} + \frac{10}{45} = \frac{37}{45}$

2d. $\frac{5}{7} + \frac{8}{9} + \frac{9}{10} = \frac{450}{630} + \frac{560}{630} + \frac{567}{630} = \frac{1577}{630}$.

The numerators of fractions having the same denominator signify like parts.

Subtraction.—Rule. Reduce the fractions to a common denominator, subtract the numerator of the subtrahend from that of the minuend, and place the numerator above the denominator.

Ex. Subtract $\frac{2}{7}$ from $\frac{5}{12}$ remainder $\frac{11}{84}$

$\frac{5}{12} = \frac{35}{84}$ from 35

$\frac{2}{7} = \frac{24}{84}$ take 24

11

To subtract a fraction from an integer, *subtract the numerator from the denomi-*

nator, and place the remainder above the denominator, and prefix to it the integer diminished by unity.

Ex. Subtrac. $\frac{3}{5}$ from 12 remainder $11\frac{2}{5}$.

Multiplication.—Rule. Multiply the numerators of the factors together for the numerator of the product, and the same for the denominator.

Ex. 1st $\frac{2}{3} \times \frac{5}{7} = \frac{10}{21}$

$2 \times 5 = 10$ numerator.
$3 \times 7 = 21$ denominator.

2d. $8\frac{2}{5} \times 7\frac{3}{4} = \frac{1302}{20} = 65\frac{2}{20}$

$8\frac{2}{5} = \frac{42}{5}$

$7\frac{3}{4} = \frac{31}{4}$

$42 \times 31 = 1302$
$5 \times 4 = 20.$

To multiply $\frac{5}{7}$ by $\frac{2}{3}$ is the same as to find what two third parts of $\frac{5}{7}$ comes to; if one-third part only had been required it would have been obtained by multiplying the denominator 7 by 3, because the value of fractions decreases as that of their denominators increases, and this comes to $\frac{5}{21}$; and because two-thirds were required that fraction must be doubled by multiplying the numerator by 2 which gives $\frac{10}{21}$. Hence compound fractions are reduced to simple ones by multiplication.

If a number be multiplied by an integer the value is increased, and if by a proper fraction its value is diminished; the product being less than the number multiplied.

Division.—Rule. Multiply the numerator of the dividend by the denominator of the divisor, and the product is the numerator of the quotient; then multiply the denominator of the dividend by the numerator of the divisor; and the product will be the denominator of the quotient.

Ex. Divide $\frac{2}{5}$ by $\frac{7}{9}$ quotient $\frac{18}{35}$

$2 \times 9 = 18$
$5 \times 7 = 35.$

If the divisor and dividend have the same denominator it will suffice to divide the numerators.

Ex. $\frac{12}{7}$ divided by $\frac{3}{7}$ gives 4.

The quotient of any number divided by a proper fraction is greater than the dividend; for it is evident that any integer contains more halves, thirds, &c. than it does units.

DECIMAL FRACTIONS.

A decimal fraction is one whose *denominator is 10*, or a power of 10, but instead of writing the denominat
a comma is placed before the n
denote the fraction; and the n
figures after the comma forms
of the power of 10 in the denom
there must be as many cyphers
in the denominator as figures
comma.

Thus, 4,7 is 4 and $\frac{7}{10}$

·47 is forty.seven hundredth
·047 forty-seven thousandth
4·07 four, and seven hundre
4·007 four, and seven thousan

To reduce Vulgar to Decima
tions. Annex a cypher to the
and divide it by the denominat
a cypher continually to the rema

Ex. $\frac{17}{75}$ = ·16 $\frac{5}{64}$ = ·078125

```
75)120(16        64)500(07
   450              448
   ---              ---
     0               520
                      32
                      16
```

The reason of this operation
from considering that the nume
vulgar fraction is understood to b
by the denominator.

Those vulgar fractions whic
duced to decimals are called f
mals; and those which alway
remainder in division, infinite

Lower denominations may be
ed as fractions of higher ones an
to decimals accordingly.

The value of decimal places
as that of integers; ten of the lo
being equal to one of the ne
therefore the operations are pe
the same manner with both, r
ing had to the pointing and ar
the decimals."

In addition and subtraction,
units under units, tenths under
proceed as with integers.

```
  32·035          From 13
 136·374          Take  9
 160·63                 ---
  12·3645               4
 --------
 341·4035
```

In multiplication, "allow as
cimal places in the product as
in both factors. If the produc
so many places, prefix cyphers
hand."

```
Ex.   1·37          ·1572
      1· 8           ·12
      -----         -----
      1·096         18864
      1·37
      -----
      2.466
```

To multiply decimals by 10
decimal point one place to the
so on in multiplying 100, 1000,

In division, "point the quoti
there may be an equal number
places in the dividend as in th
and quotient together.

e 14 be ·7764.
)15 (7·0...)17·82, &c.
7·764

8·145, &c.

if there be the same number
places in the divisor and di
will be same in the quo-

e ·75 by ·25, the answer is 3,
number.
e more in the dividend the
have as many as the dividend
an the divisor. If there be
divisor annex as many cy-
e dividend as will complete
of decimals in the divisor and
es of the quotient will be in-

e 6 by ·125.
(64, the answer in whole num-

numbers of different denomina-
ir equivalent decimal values.—
e the given numbers under
, beginning at the least. 2. Op-
dividend in the left hand place
mber for a divisor as will bring
next superior name, and draw
ween them. 3. Begin with the
nd write the quotient of each
is decimal parts, on the right of
art next below it, and so on;
ast quotient will be the deci-
red.
duce 15s. 9¾d. to the decimal

75
8125

790625 the decimal required.

the value of any given decimal in
the integer.—Rule. Multiply the
by the number of parts in the
denomination, and cut off as
ces for a remainder to the right
here are places in the given de-
nd so proceed with the rest.
What is the value of ·375 of £1.
·375
20

7·500
12

6·000 answer 7s. 6d.

e divisor leave a remainder the
may be extended to more decimal

decimals though extended to any
re never complete; and others
nd at last sometimes consist of
places that it would be difficult
d them fully. In these cases we
tend the decimal to three, four or
laces, according to the nature of
ities, and the degree of accuracy
d.

THE EXTRACTION OF ROOTS.

oot is a number whose continual
ication into itself produces the
; and is called the square, cube,
root, &c. according as it is when
to the 2d, 3d, 4th, 5th, &c. power. equal to that power. Thus, 2 is the square root of 4, because 2 × 2 = 4; and 4 is the cube root of 64, because 4 × 4 × 4 = 64, and so on.

There are some numbers of which a precise root can never be determined; but by decimals we can approximate towards it with a great degree of exactness. The roots which approximate are called surd roots, and those which are perfect rational roots.

Roots are sometimes denoted by writing the character $\sqrt{}$ before the power with the index of the root against it: thus, third root of 70 is expressed $\sqrt[3]{70}$, and the second root of it is $\sqrt{70}$, the index 2 being always omitted when the square or second root is designed.

If the power be expressed by several numbers or connected by the signs + or − a line is drawn over all its parts; thus, $\sqrt[3]{29-13}$.

Roots are sometimes designed like powers with fractional indices: thus, the square root of 5 is $5^{\frac{1}{2}}$, the third root of 19 is $19^{\frac{1}{3}}$, &c.

TO EXTRACT THE SQUARE ROOT.

Rule 1. Distinguish the given number into periods of two figures each, by putting a point over the units, another over the hundreds, and so on. 2. Find a square number equal to, or the next less than the first period, and put the root to the right hand of the given number, and it will be the first figure of the root required. 3. Subtract the assumed square from the first period, and to the remainder join the next period for a dividend. 4. Place the double of the root found on the left hand of the dividend for a divisor. 5. Consider what figure must be annexed to the divisor, so that if the result be multiplied by it, the product may be equal to, or next less than the dividend, and it will be the third figure of the root. 6. Subtract the product from the dividend, and to the remainder bring down the next period for a new dividend. 7. Find a divisor as before, by doubling the figures in the root, from which find the next figures of the root, as in the last article; and so on to the last.

Note. If there are decimals in the number, it must be pointed both ways from units, and the root be made of as many whole numbers and decimals as there are periods belonging to each; and when the figures belonging to the given number are exhausted, the operation may go on by adding cyphers.

Ex. Required the square root of 5499025.

$\dot{5}4\dot{9}9\dot{0}2\dot{5}$(2345 the root.
4

43)149
129

464)2090
1856

4685)23425
23425

0

EXTRACTION OF THE CUBE ROOT.

Rule 1. Find the nearest rational cube to the given number, which call the assumed cube. 2. As twice the assumed cube added to the given number, is to twice the given number added to the supposed cube, so is the root of the supposed cube to the root, nearly 3 by taking the cube of the root thus found for the supposed cube, and repeating the operation, the root may be had to a greater degree of exactness.

Ex. 1. What is the cube root of 12484?

By trial I find the nearest root less than the given number is 23, the cube of which is 12167; then

$12167 \times 2 + 12484 = 36818$ and

$12484 \times 2 + 12167 = 37135$. Therefore

As 36818 : 37135 :: 23 : 23·198, which is the required root nearly.

2. What is the cube root of 2?

As the nearest rational root is 1 we have

$1 \times 2 + 2 = 4$ and $2 \times 2 + 1 = 5$.

Then, $2 : 5 :: 1 : \frac{5}{4} = 1{\cdot}25$ the root nearly.

TO EXTRACT THE ROOTS OF POWERS IN GENERAL.

Rule 1. Point off from the unit's place in the given number as the root required directs. 2. Find the first figure of the root by trial, and subtract its power from the given number. 3. To the remainder bring down the first figure in the next period, which call the dividend. 4. Involve the root to the next less power, to that which is given, and multiply it by the number denoting the given one for a divisor. 5. Find how often the divisor may be had in the dividend, and the quotient will be another figure of the root. 6. Involve the whole root to the given power, and subtract it from the given number. 7. Bring down the first figure of the next period to the remainder for a new dividend, to which find a new divisor, and so on till the whole is completed.

Ex. What is the cube root of *53157376*?

$$\dot{5}3\dot{1}57\dot{3}76(376$$

$$27 = 3^3$$

$$3^2 \times 3 = 27)\overline{261} \quad \text{the dividend}$$

$$\overline{50653} = 37^3$$

$$37^2 \times 3 = 4107)\overline{25043} \quad \text{second dividend}$$

$$53157376$$

$$\overline{0}$$

ARITHMETICAL *complement of a logarithm*, the sum which a logarithm wants of 10·00000; thus the arithmetical complement of the log. 8·154032 is 1·845968.

ARITHMOMANCY, a kind of divination performed by means of numbers.

ARK, a floating vessel built by Noah for the preservation of himself and family. It was made of gopher wood or cypress. Ark of the covenant was a small chest containing the golden pot that had manna, Aaron's rod, and the tables of the covenant. *It was* made of shittim wood and the cover was of solid gold, which [illegible] called the mercy seat, and over it [illegible] two cherubim or figures with [illegible] clining towards each other.

ARLEQUIN, a trivial name [illegible] some birds, shells, &c. on account [illegible] variety of their colours.

ARMADA, a Spanish term for [illegible] fleet of men of war, and [illegible] means a fleet of six or eight ships.

ARM *of the sea*, in geography, [illegible] branch of the sea or river.

ARMED, the loadstone is [illegible] armed when inclosed or set [illegible] steel, to increase its magnetic [illegible] sea language *armed* denotes a [illegible] out for warlike purposes, also a [illegible] shot covered over with [illegible] *heraldry* armed denotes the [illegible] claws, &c. of beasts or birds of [illegible] are of a different colour from the [illegible]

Armed ship is a vessel hired [illegible] king's service in time of war, and [illegible] ployed as a transport, or for [illegible] coast, convoys, &c.

ARMIGER, in the heraldic [illegible] means an armour bearer or esquire.

ARMILLA *membranosa*, in [illegible] the circular ligament which [illegible] the tendons belonging to the [illegible] within a circle in the region of [illegible] pu[illegible].

ARMILLARY, or *Armillaris*, [illegible] made up of rings or circles.

ARMILLARY *sphere*, an artificial [illegible] composed of a number of [illegible] mundane sphere, placed in [illegible] order to assist the imagination [illegible] ing an idea of the heavens, and [illegible] tions of the celestial bodies. [illegible] millary sphere revolves on its [illegible] an horizon which is divided into [illegible] and moveable upon a brass [illegible] The other parts are the equin[illegible] meridian, tropics and polar circles.

ARMISTICE, in military [illegible] porary truce or cessation of ar[illegible]

ARMOISIN, a silk stuff, or [illegible] fety, made in the East Indies [illegible] France.

ARMOUR, habiliments for[illegible] use of to defend the body; [illegible] helmet, a shield, cuirasse, [illegible] &c.

ARMS *charged*, in heraldry, [illegible] retain their antient integrity [illegible] ditional mark of honour. [illegible] *cal arms*, are those in which [illegible] allude to the name of the fami[illegible] *entire arms*, are those which [illegible] original state without altera[illegible] dition. *False arms* are such [illegible] conformable to the rules of her[illegible]

ARMS, in falconry, signify the [illegible] hawk, from the thigh to the foot.

ARMS, king at, &c. See [illegible] *Pursuivant*.

ARMY, a number of soldier[illegible] ing of horse and foot, provided [illegible] tillery, &c. under the command [illegible] neral, having lieutenant-general[illegible] generals, brigadiers, and other [illegible] under him. An army consists [illegible] drons and battalions, and is usually [illegible] vided into three corps, and formed [illegible] three lines: the first line is called [illegible] van-guard, the second the main [illegible]

of Europe. They
chronic rheuma-

principle of plants.
rmacy, those sub-
a fragrant penc-
pungent taste, and
ulating power on

dry, the represen-
w the roots.
a spirituous liquor
s. It is a general
raters of all sorts:
ck, is a spirit dis-
juice, called toddy,
sions made in the
oddy is a pleasant
t afterwards it be-
English at Madras
g their bread.
inds of arrack, as
is a vinous spirit
n from rice and
he cocoa-nut juice.
nbo arrack are not
The Goa arrack is
writer asserts that
g, and rectifying
can maple, he has
nor to that of the
nks that the juice
irch would answer
rrack is not to be
but in warehouses
he act of 6th Geo.
Arrack is a spiri-
e Tartars in Tun-
ft to sour, and then
wice. It is very in-

n law, the setting

of combining with two doses of oxygen, and of forming compounds. When exposed to a strong heat it burns with a dark bluish flame: and the substance which sublimes is the white arsenic of trade. It is a combination of arsenic and oxygen, and denominated white oxide of arsenic, and by Fourcroy *arsenious acid*. It a procured in abundance in extracting other metals from their ores. Its taste is acid leaving an impression of sweetness. A solution of it in water gives a red colour to vegetable blues. When evaporated the oxide crystallizes in tetrahedrons, and if heated in close vessels this oxide becomes pellucid, but exposed to the air it recovers its former appearance. This oxide combines with most metals, and renders them brittle. Arsenic with an additional dose of oxygen, forms a compound called by Scheele arsenic acid. Arsenic does not combine with carbon or hydrogen; but the last in a gaseous state dissolves it. Sulphur combines with arsenic, as does phosphorus. By fusing platina and the white oxide of arsenic together, that metal becomes capable of being made into utensils. After fusing the mixture is hammered into bars. The arsenic carries off with it most of the baser metals that are present, and the platina becomes ductile. Arsenic possesses the property of destroying the magnetic virtue of iron and other metals.

ARSIS and THESIS, in music, a point is said to move *per arsin et thesin*, which rises in one part and falls in another, and the contrary.

ARSON, in criminal law, the same with house burning, which is felony.

ART AND PART, in the law of Scotland, an accomplice.

grows wild in lanes, hedges, and uncultivated places. 3. Artemisia arborescens, or tree wormwood, grows in Italy and the Levant. It rises to the height of about seven feet. 4. Artemisia dranunculos, or tarragon, is used as a sallad, especially by the French. It spreads by creeping roots. 5. Artemisia maritima, or sea wormwood, grows on the sea coasts, where there are several varieties. 6. Artemisia Pontica, or Pontic wormwood, commonly called Roman wormwood, is a low herbaceous plant, the stalks of which die in autumn, and new ones appear in spring. 7. Artemisia santonicum produces the semen santonicum, used as a vermifuge. It grows in Persia, from whence the seeds are brought to Europe. 8. *Artemisia vulgaris*, or common mugwort, grows wild on banks, and by the sides of foot-paths.

ARTERIOSE *canal*, a tube in the heart of a fœtus, which, with the foramen ovale, preserves the circulation of the blood, &c.

ARTERIOTOMY, in surgery, the opening of an artery to procure an evacuation of blood: it is only used in cases of great emergency.

ARTERY. See *Anatomy*.

ARTHRODIA, in natural history, a genus of imperfect crystals. Also a species of articulation, in anatomy, whereby the flat head of one bone is inserted into the shallow socket of another.

ARTICHOKE. See *Cinara*. For *Jerusalem Artichoke*, see *Heleanthus*.

ARTICLE, in grammar, a particle which expresses the cases and genders of nouns. The Latin has no article; the Greek has ὁ; and most of the eastern and western languages have articles.

ARTICULATION, in anatomy, is the junction of two bones intended for motion. There are two kinds, the one called diarthrosis or that which has a manifest motion; the other synarthrosis, which has only an obscure motion. In botany, *articulation* is a term applied to the joints of reeds, &c.

ARTIFICIAL *lines*, those which represent on a sector or other scale, the logarithmic sines and tangents: which by the help of the line of numbers, serve for the solution of questions in trigonometry, &c.

ARTILLERY, cannon, mortars, howitzers, petards, &c.; also the apparatus, belonging to these warlike instruments. Likewise the science of gunnery. A *train of artillery*, is a number of pieces of ordnance, to which are attached horses, spare carriages, mortar beds, &c. A *brigade of artillery*, consists of eight or ten pieces of cannon, with the necessary appendages. A *park of artillery*, is the place appointed to encamp the train of artillery. the figure is generally that of a parallelogram. A *field of artillery*, includes every requisite to forward the operations of an army.

ARTOCARPUS, the *bread fruit tree*, in botany, a genus of the monandria order, and of the monoecia class of plants. It has a cylindric amentum covered with flowers; male calyx two valved, without a corolla: the female has no calyx or corolla; stylus one, and drupa many celled. The species are, 1. Artocarpus incisa, or the bread fruit tree of Otaheite, *and other islands* in the South Seas. It is
about the size of a middl
leaves are long, and like the
tree. The fruit is about the
of the head of a new born
tween the skin and the core
part, very white, and of the
of new bread. Before it is
be roasted, when it has a
The fruit baked in an oven be
a boiled potatoe. The fruit of
is gathered just before it is ri
heaps covered with leaves;
it ferments: the core is then
the remainder thrown int
with grass; the whole is the
leaves and stones placed
this state it undergoes a sec
tion, and becomes sour. It
as it is wanted. 2. Artocarp
is called in the East Indies,
Though it bears a fruit like
of an inferior quality. There
rieties.

ARTS, are usually divide
and mechanical; the former
poetry, painting, sculpture,
&c.: the latter take in ca
sonry, &c. The *fine arts* seem
adopted from what the Frenc
arts, which are painting, eng
ture, music, &c.

ARUM, *wake robin*, or
a genus of the polyandria o
nandria class of plants; in
method ranking under the
piperitæ. The spatha is m
and cowlshaped, the spadix,
female below, and staminous
dle. There are 3[illegible] species,
are, 1. Arum arborescens, or
a native of the sugar islands
It has an acid juice. 2. Arum
well as the arum proboscidium
tenuifolium are all denomin
cowl from the shape of the flo
appear in April. 3. Arum co
with the arum divaricatum,
peregrinum, and sagittifolium
roots which are eaten in ho
The leaves of the esculentum
kale, are also made use of wh
vegetables are not to be had.
varicatum has spear-shaped lea
dranunculus, or common dra
naturally in the southern par
The stalk is straight, and abo
in height, and spotted like a
flower which grows at the top
has a long spathe of a dark pu
6. Arum Italicum, is a nativ
Spain and Portugal: the leave
a foot long, very large, and
white, interspersed with blac
Arum maculatum, or common
grows in woods, and on sha
most parts of Britain. The lea
bert-shaped, entire and spott
ries numerous. It flowers in
receptacle is long and club-s
the seed-buds surrounding th
chives are fixed to the recept
the seed-buds, between two r
drills. 8. Arum trilobatum,
Ceylon, is a native of India.
plant, and the flower which ri
root, is of a fine scarlet colour.
of the maculatum and dranu
used in medicine, as stimula

and downy. The most
1. Arundo bambos, or
e East Indies, and some
, where it frequently
ht of sixty feet The
k, jointed, and sends
f a considerable length.
ble those of the com-
young shoots are made
. The stalks when young
juice; but as they grow
me hollow, except at the
are stopped by a woody
ich the liquor concretes
called tabaxir or sugar of
s highly esteemed by the
ld stalks grow to five or
r, and are then of a yel-
are used in building, and
niture; also for water
stalks are used for walk-
inhabitants of Otaheite
em. 2. Arundo donax,
, is a native of warm cli-
ow with us in moderate
lks are used for fishing
ers. 3. Arundo orientalis,
eks, as we do quills for
n Palestine 4. Arundo
common marsh reed,
of rivers, and in stand-
ndo versicolor or Indian
is supposed to be a va-
; as the arundo picta is
s.

S, in anatomy, two car-
some others, form the
. The term is also ap-
scles of the larynx.

y, a weight of twelve
ame with libra or the

ASCARINE, in botany, a genus of the dioecia monandria class and order. Calyx ament, filiform; corolla none; male, anther wormshaped: female, style none; stigma three lobed drupa. There is only one species, which is a native of the Society Islands.

ASCARIS or ASCARIDES, a genus of the order of vermes intestinæ. They are found in the bodies of animals; and are round and elastic, with three protuberances at the head. They are very prolific. There are two species: 1. Ascaris lumbricoides, is about the length of the common earth-worm: and is most commonly found in the human intestines. It is viviparous, and produces great numbers. 2. Ascaris vermicularis with faint annular rugæ, and the mouth transverse. It is about a quarter of an inch long, and thicker at one end than the other. It is found in boggy places, and in the rectum of children and horses.

ASCENDANT, or *ascending line*, in law is a term applied to those ancestors nearest the root of the family.

ASCENDING, in astronomy, is said of those stars which are rising above the horizon in any parallel of the equator. Ascending latitude is the latitude of a planet advancing towards the north pole. Ascending node is the point of a planet's orbit, wherein it passes the ecliptic to proceed to the north. This is called the northern node.

ASCENDING *Vessels*, in anatomy, are those which carry the blood upwards.

ASCENSION, in astronomy, is either right or oblique. Right ascension of the sun or a star, is that degree of the equinoctial, counted from the beginning of forming asheath. There are six species, only one of which is found in the British seas. They have the faculty of squirting out the water which they have taken in.

ASCII, in geography, denote those inhabitants of the earth who at certain times have no shadow; as the inhabitants of the torrid zone when the sun to them is vertical.

ASCITES, the dropsy.

ASCIUM, a genus of plants of the polyandria monogynia class and order. It is a tree which grows in Africa.

ASCLEPIAD, in poetry, a verse consisting of four feet the first a spondee, the second a choriambus, and the two last dactyles, or of four feet and a cæsura, the first a spondee, the second a dactyl, then a cæsura. and lastly, two dactyls.

ASCLEPIAS, *swallow-wort*, in botany, a genus of the digynia order, and pentandria class of plants, in the natural method, ranking under the 30th order, contortæ. The generic character is taken from five oval, concave, horn-like nectaria, which are in the flower. The most remarkable species are, 1. Asclepias alba, or common swallow-wort, which is a native of the south of France, Spain, and Italy. 2. Asclepias curassavica, or bastard ipecacuanha, is a native of the warm parts of America. It grows to the height of above five feet, and bears scarlet flowers. This species is tender, and must be kept in a stove. 3. Asclepias Syriaca, or greater Syrian dog's bane, is a perennial plant; the flowers are purple. The root of the first species is used in medicine as a sudorific and diuretic.

ASCYRUM, *Peter's wort*, in botany, a genus of the polyandria order, and polyadelphia class of plants: in the natural method ranking under the 20th order, rotaceæ. Calyx four-leaved; corolla four-petalled; filaments numerous, and having four boundaries. There are three species, 1. Ascyrum crux Andreæ. 2. Ascyrum hypericoides, 3. Ascyrum villosum; they are natives of the West Indies.

ASH. See *Fraxinus.*

ASHES, the earthy part of wood and other combustibles after being consumed by fire. All kinds of ashes contain an alkaline salt, and are excellent manure for cold wet grounds. They are also of use in making lixiviums or lyes for bleaching, &c.

ASHLER, a term in masonry for common or free stones as taken out of the quarry.

ASILUS, or hornet-fly, a genus of insects of the order diptera. It has two wings and a horny, straight, two-valved beak. There are seventeen species. They are very troublesome to cattle.

ASP. See *Coluber.*

ASPALATHUS, *African broom*, in botany, a genus of the decandria order, and diadelphia class of plants; in the natural method ranking under the 32d order, papilionaceæ. The calyx consists of five divisions; the pod is oval, containing two seeds. There are thirty-seven species, all natives of warm climates, and must be preserved here in stoves. The *rose-wood*, from whence the oleum rhodii comes, is *one of these species.*

ASPARAGUS, a genus of the monogynia order, and hexandria class of
the natural method ranking
11th order, sarmentaceæ. Caly
partite; three inferior peta
wards; the berry three-celled
taining two seeds. There
species; but the only one c
gardens is the common aspara
upright, herbaceous stalk, br
and equal stipula. It is raised
which are thus saved; mark
the fairest buds, and when
berry, and the stalks begin to
them up; gather the berries
and, pouring water upon the
about with your hands; the
breaking and letting out the
off with the water. The se
dried, and in the beginning
sown, but not thick, on a bed
They must be trod into the
the earth raked smooth over
October, when the stalks are
dry, some rotten dung must
over the surface of the bed.
the plants will be fit to plant
ground must be prepared by
and burying therein rotten d
asparagus is to be planted out
ginning of March, if the soil is d
season forward: but in a wet
the beginning of April. The ro
placed two inches beneath th
and between every four rows
two feet and a half should be
obtain asparagus in the wint
roots of one year old in a moist
the second and third year after
they will be fit for hot-beds, wh
be made strong with new stable d
beds must be covered with earth
thick, then against a ridge at one
to lay the plants without cutting
and between every row lay a rid
earth, then cover the bed two inc
with earth encompassed with
band; and in about a week p
frames and glasses, and three inc
of fresh earth. These beds may
from November till March.

ASPECT, in astronomy, the si
the celestial bodies with relation
other. There are five kinds:
aspect, is, when the planets or st
degrees distant. 2. The quartile
drate, is when they are 90d. dist
is when they are 120d. 4. Opposi
180d. distant. 5. Conjunction w
are in the same degree. The
make visionary work of these p

ASPECT, *double*, in painting,
a figure is so managed as to repre
or more different objects, eithe
changing of the position of the e
means of angular glasses.

ASPECT, in military language,
rious acceptations, first, it denotes
file of the land or coast. A
aspect is when an army holds
appearance; an *imposing aspect* i
an army appears stronger than
reality.

ASPEN *tree*, see *Populus.*

ASPER, an accent peculiar to the
language, marked thus (‘), and
that the letter over which it stan
be strongly aspirated or pronounc
an *h* was joined to it.

[illegible]. Corolla infun-
psule contains two globular
are 11 species, the chief of
Asperula cynanchica, which
chalky hills; the roots are
u for dying red. 2. Aspe-
a low umbelliferous plant,
wild in woods, and flowers
mell is pleasant, and it gives
uous liquors. The asperula
led in obstructions of the li-
y ducts, and by some in epi-
ties.
UM, see *Bitumen*.
LUS, *asphodelus* or *king's*
s of the monogynia order,
class of plants. The calyx is
and the nectarium consists
The species are, 1. Aspho-
s or white asphodel; the
g, the stalks rise above three
several spreading branches,
ue by loose spikes of white
sphodelus luteus or common
lel, has round single stalks,
t high, with yellow flowers,
in June. 3. *Asphodelus fis-*
tu-leaved asphodel, is an an-
hose flowers are white.
, in grammar, denotes those
are marked with an asper:
ion signifies the pronouncing
ith greater strength.
M, *milt-waste*, or *spleen wort*,
genus of plants of the order
onging to the cryptogamia
are 24 species; two of which
Britain and grow upon old
ist rocks, one is called scolo-
hart's tongue; the other
pleen wort. It has been re-
as a pectoral, and good for

2. *Silver* is to be obtained pure by dissolving it in nitric acid and precipitating it with a diluted solution of sulphate of iron.

ASSETS, in law, goods or property in the possession of a person with which he is enabled to discharge an obligation imposed upon him.

ASSIGNEE, in law, one appointed by another to transact his affairs. Assignees may be by deed or law; by deed when the lessee of a farm assigns it to another; by law when the law makes an assignee without any appointment of the person intitled, but when there is an assignee by deed, one by law is not allowed. The term is mostly applied to those creditors of a bankrupt who are entrusted with the management of the estate.

ASSIGNING, in a special sense, is the setting forth and pointing at, as to assign an error, false judgment, &c. when it is necessary to shew wherein the error lies, and how the judgment is unjust.

ASSIGNMENT, in law, differs from a lease in this, that by a lease a man grants an interest less than his own: but in assignment the whole property.

ASSIMILATION, in philosophy, that motion by which bodies related are converted into each other.

ASSISE, an assembly of knights and other substantial men, with the justice, at a fixed place and time; at present it is used for the court and time when and where writs and processes are decided by judges and jury.

ASSOCIATION *of ideas*, is where two or more ideas constantly and immediately follow one another in the mind, so that one necessarily produces the other, whether they have a natural relation or not.

ASSONIA, in botany, a genus of plants

strument by which this contract is effected is called a policy; and is signed only by the assurer, who is therefore called an underwriter.

Assurances may be divided into marine assurances, assurances on lives, and assurances against fire. *Marine* assurance is an indemnity against the perils to which ships and goods are liable in the course of their voyage, which are the dangers of the sea, fire, the enemy, pirates, and the fraudulent acts of the master and crew. *Life assurance* is a contract by which the underwriter engages for a certain sum to pay a sum of money if the person whose life is insured shall die within a time specified in the policy.

Assurances against fire are made upon buildings in general, household furniture, apparel, merchandize, stock in trade, ships, and all property liable to be consumed, except writings, notes, bonds, money, and similar articles. These assurances are made generally from year to year, and are distinguished into, 1. Common assurances, which are on stone buildings in which no hazardous trades are carried on, or goods deposited. 2. Hazardous assurances are those of timber or plaister buildings, in which no hazardous trades are carried on nor hazardous goods deposited: also on hazardous trades carried on in brick and stone buildings; likewise on hazardous goods in such buildings, ships in dock or building, &c. 3. Double hazardous assurances are those on any of the hazardous trades carried on or goods deposited in timber or plaister buildings; on glass, china and earthern ware; also thatched buildings or goods therein and on salt petre.

ASTER, *star-wort*, in botany, a genus of the polygamia superflua order, and syngenesia class of plants: in the natural method ranking under the 49th order compositi radiati. Receptacle naked, pappus simple: the rays of the corolla exceed ten, and the calyx is imbricated. There are 60 species most of which are perennial plants and propagated by parting their roots early in the spring. They are very prolific but grow best in the shade.

ASTERIA, or *cat's eye* in natural history, a pellucid gem exhibiting various colours as viewed in different lights. Also the name of an extraneous fossil called the star stone.

ASTERIAS, *star fish*, a genus of the order of vermes mollusca. It has a depressed body with a coriaceous coat, composed of five or more segments running out from a central part and furnished with numerous tentacula. The mouth is in the centre, and is armed with sharp teeth. From this mouth proceeds a canal through all or most of the rays. The tentacula serve the animal to walk with, and can be contracted or shortened at pleasure. Most of the species, of which there are about 14, are natives of the British seas.

ASTEROIDES, a name given by Dr. Herschel to the celestial bodies discovered in our system by Piazzi, Olbers, and Harding, but which foreign astronomers contend, are regular planets.

ASTEROPODIUM, a sort of extraneous fossil, of the same kind as star stones.

ASTHENIA, a medical term denoting bodily debility.

ASTHMA, a painful, laborious, and
ficult respiration, owing to a
the lungs, which disturbs the free
lation of the blood. This disorder
companied with violent motions
aphragm and the abdominal and
tal muscles; it is commonly divided
pneumonic and convulsive;
continual or intermitting and

ASTRAGAL. See *Architecture*.

ASTRAGAL, in gunnery, a round
ing encompassing a cannon about
inches from the mouth.

ASTRAGALUS, *milk vetch* or
vetch, in botany, a genus of the
order and diadelphia class of
the natural method ranking under
order papilionaceæ. There are
Astragalus communis, grows wild
uncultivated places, and is deemed
for cattle. The astragalus
thorny bush, which grows in Crete,
and Greece, and yields the gum
canth.

ASTRAGALUS, in anatomy, called
wise *talus*, the superior and
the foot.

ASTRANTIA, *master-wort*, a
the digynia order and pentandria
plants, in the natural method
under the 45th order, umbellatæ.
volucrum is lanceolated, open,
coloured. There are five species,
which are remarkable.

ASTRINGENTS, in pharmacy,
of the corroborative kinds.
thought by some to act in the
ner on the simple or dead
as on the living solid, in
thickening and hardening;
to the living solid they produce
bone and strength, and check
evacuations; to the dead fibre,
casion toughness, density, and
ousness to water.

ASTROITES, or *star-stone*,
history, a species of coral found
the earth resembling a star.
pose them to be petrified marine

ASTROLABE, a stereographic
of the sphere, either on the
equator, the eye being supposed
the pole of the world, or on the
the meridian, the eye being
the point of intersection of the
and horizon.

ASTROLOGY, a fictitious
tending to foretell future events
aspects and situation of the

ASTRONIUM, in botany, a
plants of the pentandria order,
class. The male calyx is five-
corolla quinquepetalous. The
calyx and corolla are the same as
the styli are three and seed one.
only one species, which is a
Jamaica.

ASTRONOMICAL *place* of a
planet, is its longitude or place
ecliptic, reckoned from the
Aries.

ASTRONOMY, is that science
treats of the heavenly bodies
phenomena. Some, indeed,
term to the theory of the universe
primary laws of nature; but
a mixed mathematical science,
we become acquainted with the

. Galileo. The an-
except Pythagoras,
f the immobility of
ch was called the
' Ptolemy, an Egyp-
he second century,
centre of the system
nets in the following
, Mercury, Venus,
r, and Saturn, be-
ed the fixed stars.
r, is clogged with
culties, as to have
hich is commonly
, from the inventor,
who, in 1530 res-
1. His work was
nd the author re-
ars before his death.
ed the diurnal mo-
own axis, and also
ptic round the sun.
eceived without op-
was thrown into the
for maintaining it,
his liberty without
notion. But it was
the system met
en an able astro-
d enough to reject
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ppen on board a
ite, where if a stone
would drop at the
n hence, however,
project another sy-
which he placed the
moon revolve round
fixed stars; then

distant from both poles, and at right angles to the axis; this is called the *equator*, because it divides the heavens into two equal parts. If H O be the horizon the highest point, or that over our heads, as M, is called the zenith; and the opposite one N, the nadir.

The sun rises in the east, ascends to the highest point in the arch, which he describes, and descends in the west. The highest point to which he ascends is called the mid-day point; through which, and the zenith, if a great circle is drawn it is called the meridian of the place; and all the stars cross this circle or meridian twice in twenty-four hours, but those which go below the horizon are seen only to cross it once. The three great circles in the heavens are, the horizon, the equator, and the meridian. The first determines the rising and setting of the heavenly bodies; and also their altitude, for which last purpose we must suppose another great circle to pass through the star and the zenith, called a vertical circle, upon which we reckon the number of degrees the star is from the horizon. The quadrant is an instrument used to ascertain this altitude. The three great circles above mentioned form the basis of all observations on the heavenly bodies: and, therefore, it is necessary to determine their relative situations. Had the polar star been exactly at the pole nothing more need be done than to obtain the altitude of this star for that of the pole; but as it is two degrees from the pole, that number must be added to this altitude to find that of the pole.

The elevation of the pole being found it is easy to find that of the equator: thus H M O, or the visible part of the heavens he begins to move forward as before. This change in the sun's place occasions the difference in the length of the days and nights, and the vicissitudes of the seasons.

The ecliptic is that path or great circle which the sun is supposed to complete in a year. It differs in situation from the equator; for the sun rises above the equator in summer, and not so high in winter. The points of the ecliptic where the sun is when at the greatest distance from the equator are called solstitial points; and the distance between the equator and ecliptic at those points is named the obliquity of the ecliptic, which is nearly 23 deg. 30 min.

The equinoctial colure is the great circle which passes at right angles to the equator through the two points of it intersected by the ecliptic, and called the equinoctial points. The solstitial colure is the other great circle at right angles to the equator, and passes through the poles of the ecliptic.

Lesser circles of the sphere, touching the solstitial points, and at right angles to the axis, as AC, BD are called tropics; that on the north side of the equator is denominated the tropic of Cancer; and that on the south, the tropic of Capricorn. The two polar circles FG, IK are 23 deg. 30 min. distant from the poles.

The zodiac is a broad portion of the heavens extending about eight degrees on each side of the ecliptic; it is divided into twelve parts called signs; and each sign into thirty parts or degrees. Circles of celestial longitude are great circles of the sphere, standing at right angles to the plane of the ecliptic, dividing the same into equal parts. Upon the ecliptic is reckoned the longitude of any fixed star from the point where the ecliptic and equator intersect each other in the vernal equinox, called the first point of Aries, and the arch of any of these circles intercepted between a star and the ecliptic, is the latitude of that star. The equator is divided into degrees called degrees of right ascension, and from the equator to the poles the degrees of declination are counted on the meridian of the place.

Of the solar system. The greater part of the stars keep their places with respect to one another; that is, if we observe two stars having a certain apparent distance from each-other one night they have the same every succeeding night. These are therefore called fixed stars. But there are others which change their places with regard to the fixed stars and also to one another. These were formerly five; but Dr. Herschel has discovered a sixth which he has named Georgium Sidus though foreign astronomers give it the name of the person who discovered it. Four others have been since discovered by Piazzi, Olbers and Harding, and are admitted into the system under the names of Ceres, Pallas Juno, and Vesta. All these are denominated planets from the word *plano* to err or wander. Besides these there are secondary planets, called satellites or moons which revolve round certain of the primary ones. Of these our earth has one, Jupiter four, Saturn seven, and the Georgium Sidus six. All the planets move round the sun, from east to west, and in the same direction as the moons revolve round their primary, excepting those of the Herschel, which seem to move in an opposite direction. The paths in which they move round the sun, are called their orbits, which are ellipses approaching very near to circles. Their revolutions are performed in different periods of time; each of which is the year of the respective planet.

TABLE OF THE SOLAR SYSTEM.

	Apparent mean diameters, as seen from the earth.	Mean diameters in English miles.	Diurnal rotations.	Time of revolving round the sun.	Inclination of the orbit of the ecliptic.	Inclination of the axes to the orbits
The Sun,	32m. 1s. 5	813,246	25 d. 14 h. 8 m.	—	—	82d. 44m. 0s.
Mercury,	10s.	3,224	—	83 d. 23 h. 16 m.	7d. 0m. 0s.	—
Venus,	58s.	7,687	0 d. 23 h. 21 m.	224 16 49	3 23 35	—
The Earth,	—	—	24 hours	365 6 9	—	66 32 0
The Moon,	31m. 8s.	2,180	29 d. 17 h. 44 m. 3 s.	—	5 9 3	88 17 0
Mars,	27s.	4,189	0 24 39 22	686 23 30½	1 51 0	59 22 0
Ceres,	1s.	160	—	—	10 37 56	—
Pallas,	0s.5	80	—	1703 16 48	34 50 40	—
Juno,	—	—	—	2012 0 0	21 0 0	—
Jupiter,	39s.	89,170	0 d. 9 h. 55 m. 37 s.	4332 14 27	1 18 56	90 0 0
Saturn,	18s.	79,042	0 10 16 2	10759 1 51	2 29 50	60 9 0
Herschell,	3s.5¼	35,112	—	30737 18 0	0 46 20	—

The planets are opaque bodies, and shine by reflecting the light which they receive from the sun. Venus and Mercury being nearer to the sun than our earth are called inferior planets, and the rest which are without the earth's orbit are denominated superior planets. We have already said that the planets move round the sun in elliptical orbits; that in which the sun is situated is called the lower focus. If we suppose the plane of the earth's orbit which passes through the centre of the sun to be extended in every direction as far as

cribe a great circle,
hich the situations
r planets are com-

bits of all the other
rough the centre
ended as far as the
fferent circles from
the ecliptic; one
eing on the north
south side of the
the orbit of each
c in two opposite
les of the planet.
t passes from the
e ecliptic is called
and the other the
angle which the
it makes with the
called the inclina-
it.

planet's orbit far-
the body round
led the apsides, the
sually named the
er the perihelion;
hese points is call-
s. When the sun
the earth they are
and when farthest
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ween the sun and
s between it and
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and this is called

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motion of the pla-
cribed by this line,
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planet's motion.
m their periodical
nt times, but the
distances are as the
dical times.

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anets move. These
of attracting each
some irregularity in
utual attraction be-
the sun keeps them
ir orbits by the cen-
generated by their
and this force again
ling into the sun,
se it it were not for
upon them. Thus
nce each other, and
he system.

Of the Sun. From the motion of the spots which appear on the face of the sun, it has been found that this great luminary revolves on its axis in twenty-five days. This axis is inclined to the ecliptic in an angle of about 82° 30'.

The following are Sir I. Newton's observations on the sun. 1. That its heat is seven times greater in Mercury, than with us, and that water there would be all carried off in steam. 2. That the quantity of matter in the sun is to that of Jupiter, as 1100 to 1, and that the distance of Jupiter from the sun is in the same ratio to the sun's diameter; consequently the centre of gravity of the sun and Jupiter, is nearly in the superficies of the former. 3. That the quantity of matter in the sun, is to that of Saturn, as 2360 to 1, and the distance of Saturn from the sun is in a ratio little less than that of the sun's semi-diameter, whence the common centre of gravity of Saturn and the sun is a little within the latter. 4. Therefore the common centre of gravity of all the planets cannot be more than the length of the solar diameter from the centre of the sun. 5. The sun's diameter is equal to 100 diameters of the earth, and the whole body exceeds that of the earth a million of times. 6. If 360 degrees is divided by the quantity of the solar year, it gives 59' 1'', and the horary motion is 2' 27''.

Of the inferior planets.—Mercury being nearest the sun, is seldom visible, and never appears more than a few degrees from the sun's disc. The period of its revolution on its axis is unknown. It is sometimes seen passing over the solar disc, and this is called its transit. Venus is the brightest of the planets, and is termed the morning or evening star, as it precedes or follows the apparent course of the sun. The time of its rotation on its axis is not known. Venus appears with phases like the moon, and passes sometimes over the sun's disc.

The *elongation* of a planet is its apparent distance from the sun.

An inferior planet is at its greatest elongation when a line drawn from the earth, through the planet is a tangent to the planet's orbit.

Of the Earth.—That our planet is a globular body, is easily proved. Mariners when they leave land, first begin to lose sight of the lower parts, and so on gradually of the higher: and persons on shore, first see the tops of the masts, before the ships themselves appear. Now if the earth were a perfect plane, all parts would be seen at once. The earth is not however, a perfect sphere, but a spheroid, having its equatorial diameter longer than the polar, or the axis. The diameter at the equator is 7977 miles, and that at the poles 7940 miles. The earth has two motions; a diurnal on its own axis in twenty-four hours, and an annual motion round the sun in 365 days 6 hours 56m. 4s. The first motion occasions light and darkness, day and night.

The natural days are not equal; for a natural day is the time wherein the earth performs one revolution round its axis, and such a portion of the second revolution as is *equal* to the space which the *sun has apparently* gone that day; but these spaces are unequal, therefore, the additional portion of the second revolution will be at times greater or less, consequently the natural days must be unequal. Hence arises the difference between a sun dial and a time-piece, the former measuring the length of the natural day, and the latter dividing time into equal portions of twelve hours each; the clock will be before the dial when the natural day is more than twenty-four hours, and after it when less.

The *equation* of time is the difference between the mean length of the natural day, and that of a day measured by the sun's apparent motion, or between *mean* and *apparent* time. The hour by apparent time being known, to find what is the true time, add the equation to apparent time, if the day by the clock is shorter than by the dial; and subtract it when longer.

The causes of the difference between mean and apparent time, are; 1. The obliquity of the ecliptic with regard to the equator. 2. The unequal motion of the earth in an elliptical orbit.

The heavenly bodies appear higher than they really are, owing to the refraction of the rays of light by our atmosphere; so that to bring the apparent to the true altitudes, the quantity of refraction must be subtracted according to a table which may be found in all books of elemental astronomy.

The twilight is also owing to this refraction of the rays, which being bent by the atmosphere, visit the earth before the sun actually rises, and keep him in view after he is set.

Of the Seasons.—These are occasioned by the annual motion of the earth. The better to understand this, it must be considered that the axis of the earth is inclined to the plane of its orbit, about 23d. 30m. and it always keeps parallel to itself, or is directed constantly to the same point of the heavens.

All this, however, is best illustrated in the plate, where T represents the earth in different parts of its orbit round the sun. S the axis of the earth NS, inclines to the plane of the orbit, and is parallel to itself in all parts thereof. In June the north pole N inclines to the sun, and it is consequently summer to the northern parts of the earth. In December the north pole declines from the sun, and then the northern parts have more darkness than light, and consequently the days are short, and it is winter. In March and September the axis of the earth is perpendicular to the centre of the sun, and the poles NS, are in the boundary of light and darkness, and the days and nights are equal all over the globe.

Of the Moon.—The moon is a spherical body, and revolves round the earth in an elliptical orbit, and is carried with it round the sun. The moon always has the same side towards us, and its periodical time is equal to that of its revolution in its orbit round the earth. Though the year to the earth and moon is of the same length, the number of their days is different: the former having 365 natural days, and the latter only about 12, every day and night in the moon being equal to 29 days 30 hours on the earth. The face of the moon, as seen through a telescope, appears diversified with mountains and valleys. The height of the lunar mountains has been accurately ascertained by Dr. Herschel, who concludes, that with few exceptions, they do not exceed half-a mile. The same astronomer also discovered several volcanoes in the moon.

Phases of the Moon.—In the plate, by which this subject is best illustrated, S is the sun, T the earth, ABC the moon in its orbit. At A the moon is between the earth and sun, and is invisible to us, as represented at A a; at B the enlightened part x z is turned to the earth, and she appears horned, as at b; at C the half of the enlightened side is turned to the earth, and she appears a half moon, as at c; at D the part x z is turned to the earth, and it appears as at d; and at E the whole enlightened part of the moon is turned to the earth, and we have full moon, as at e. As she passes through the remainder of her orbit she assumes the same phases or appearances as before, but in a contrary order.

To the moon the earth presents similar appearances and changes. One half of the moon is never in darkness, being enlightened by the earth during the absence of the sun; the other half has alternately a fortnight's light and darkness.

When the moon is near the first of Aries, advancing to the tropic of Cancer, the time of her rising varies but little for several days together, and this which happens at full moon in the autumnal months occasions what is called the harvest-moon.

The moon's motion is irregular, owing to the inclination of her orbit to the plane of the ecliptic, and the attraction of the sun and other planets.

Of the superior Planets. Mars is of a reddish colour, and from some spots on its surface, it appears that the inclination of the axis of this planet to the ecliptic is 59d. 42m.: the node of the axis is in [illegible] 47m. of Pisces, the obliquity of the ecliptic thereon, 28d. 42m.

The figure of Mars is that of an oblate spheroid, the equatorial diameter of which is to the polar, as 16 to 15.

Ceres Ferdinandea, is the name of a small planet situated next beyond Mars, and was discovered on the first day of the present century, by Piazzi, an Italian astronomer.

Pallas is another small planet, discovered by Dr. Olbers, of Bremen, in [illegible] Juno is another small planet discovered by M. Harding, in 1804, and Vesta, another, was first seen by Dr. Olbers, March 29th, 1807.

These four planets Dr. Herschel calls asteroids. Jupiter is the brightest of the planets, except Venus. Several belts are observed across its surface, and parallel to its equator. These are supposed to be large ranges of clouds in the atmosphere of the planet, as they are sometimes of different breadths. Large spots have also been seen in these belts. Jupiter has four moons of different magnitudes, which are occasionally eclipsed by the shadow of the planet falling on them. They are of considerable use in astronomy and navigation, for the purpose of determining the longitudes of places.

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rs, 4189; Jupiter,
Georgium Sidus,

diameters of the
sun are, Mercury.

the same observation when an eclipse again occurs, and from the interval of these times, and the number of eclipses in that interval, the mean time of a synodic revolution will be had by division.

The distance of a satellite from its primary may be found by means of its greatest elongation, as seen from the earth. Another method is by measuring with a micrometer at the time of the satellite's greatest elongation, its distance from the centre of the planet, also the semi-diameter of the planet, the distance being in the same terms as the semi-diameter. Or when the periodic times of all the satellites are known and the mean distance of one of them; the mean distance of the others may be found from the proportion between the squares of the periodic times and the cube of the distances.

Of Eclipses. The sun, earth and moon being spherical, the shadows of the two last must be conical or cylindrical: thus if the sun I K (fig. 4.) be less than the earth C D, the shadow of the latter will be part of a cone, whose section is terminated by the lines C E, D F; or if the sun A B. be equal to the earth C D, the shadow will be a cylinder between the lines C G, D H. In either case the shadow of the earth must occasionally eclipse the superior planets when in opposition to the sun. But as this never happens, the sun must be larger than the earth; let A B, (fig 5.) represent the sun greater than the earth C D; the rays of light A C, B D, will meet in the point K, consequently no part of the sun's light will appear within the cone C K D; but there will be a partial shadow or penumbra between those rays A D M, B E L, that pass from the extreme edges of the sun, and touch the op-of the shadow will be equal to the sun's apparent diameter.

The angle C I D at the vertex of the penumbra is equal to the sum of the diameter of the sun seen from the earth, A C B, and the diameter of the earth seen from the sun, at C A D: or if the earth's apparent diameter from the sun be inconsiderable, the angle of the penumbra is equal to the sun's apparent diameter. These particulars apply also to the shadows of the moon.

Now let A B, (fig. 6.) represent the sun C D the earth, and I, K, or L the moon in its orbit K M N; if the moon be at I K, its total shadow may then deprive a part of the earth at O of the sun's light, and its penumbra will cause a partial eclipse of the sun to the inhabitants between G and H. Again, let the moon be at L and it will be eclipsed by the earth being between it and the sun in lunar eclipses, the earth's penumbra is not regarded. Eclipses can happen only when the moon is near one of the sides of its orbit. Let A B M (fig. 7.) be the sun, seen from the earth; C D a part of the ecliptic; and E F a part of the orbit of the moon, which planet is represented by the circles G H I. It is obvious that the eclipse of the sun depends on the position of the node N, and the angle of inclination to N D. If this angle remain unaltered while the node is far from the centre of the sun, the points K and L may be too wide to permit any occultation; and the same effect may be produced by the enlargement of the angle FND: on the contrary, the coincidence of N with K as a dimunition of the angle FNK, may cause an eclipse of a greater or less degree.

The sun's place in the ecliptic being known, with the inclination of the moon's orbit, the place of the moon, and of the node, likewise the apparent diameters of the luminaries, it will be easy to find the velocity of the moon in elongation, and consequently the beginning, middle, and quantity of obscuration, &c. of the eclipse. If the computation be made from the tabular places of the luminaries, it will give the eclipse as seen from the centre of the earth; but if it be required to determine the particulars of an eclipse for a given place, the parallax must be considered. That of the sun being very minute may be rejected; but that of the moon is considerable: for her apparent path as seen from the surface is so different from what it would be, viewed from the centre, that the same conjunction which occasions a total eclipse at one part, will not give any at another.

Let us now consider an eclipse of the moon. It is evident that the difference in the phenomena of a solar eclipse would not take place if the parallax of each luminary were the same; for whatever change of place the parallax might occasion in the one, the same would be produced in the other. Now the section of the earth's shadow passed through by the moon in a lunar eclipse, must have the same parallax at equal altitudes; and since the points of immersion, emersion, or other periods of the eclipse must in the shadow have the same altitudes as the parts of the moon they obscure, the effects of parallax *must be similar*. The earth's shadow A B

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be equal to the differe
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air.

Of the Tides. The oce
than half the globe; an
of water is in continual m
flowing alternately; tha
now at high water mark
subside and flow back to
when it will be at low
time of high water, howe
the same, but is about th
hour later every day, for
when it begins as before

For example; supp
place, it is high water a
the afternoon on the da
the next day it will be h
quarters of an hour afte
following at half past fo
the next new moon, wh
high water at three. Th
motion of the moon; fo
day about three quarters
than the preceding one
pletes her revolution ro
about thirty days.

According to the Newt
attraction, these phænon
plained.

The waters at Z on the
ADH, next the moon M (
tracted than the central p
and these again more tha
opposite side at N; there
between the earth's cent
on its surface under and
will be encreased. To e
particularly, though the
bears a considerable pro
tance from the moon, ye
nothing compared to th
from the sun, consequen
of the sun's attraction o
earth opposite to him wi
the difference of the mo
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moon must raise the t
they could be by the sun
ton has determined that
the sun in this case is thr
that of the moon. The ti
perly the joint productio
moon; or in fact there
solar and a lunar, whose
or opposite according to

s in the equator the
h in both parts of the
24 hours 50 minutes,
towards either pole the
y higher and lower in
ern latitudes. The
ded in their passage
nd so affected by capes
to happen variously at
The tide raised in the
en the moon is three
idian takes three hours
n Bridge. Lakes have
every part is attracted
erranean and Baltic seas
vations on account of
he inlets by which they
the ocean.

are opaque bodies with
on the side remote from
ich they revolve in ec-
Isaac Newton computed
net which appeared in
rest to the sun 2000 times
iron. In their motions
comets are subject to the
as the planets only their
e considerable. When
an their motion is very
emoter parts of their or-
v. Dr. Halley has cal-
letermining the orbits
h in general have been
The number of comets
stem is unknown; but
of the ancients and the
e moderns it appears
been seen previous to
at time several others
been discovered.

. These are so called
ir not changing their

stars from us cannot be ascertained, therefore they must shine by their own light as our sun does, whence it is inferred that they are suns to systems similar to ours. Some of the larger stars have not the same situations observed by antient astronomers; and new stars have appeared, while others formerly described are no longer seen. Some stars have a periodical increase and decrease: and many of the fixed stars upon examination by the telescope are found to consist of two.

The *via lactea* or milky way is a broad belt or zone, of a whitish appearance, which consists of an infinite number of small stars not to be discerned but by a very large telescope. Dr. Herschel is of opinion that the universe is full of these nebulæ or systems of stars, and that the milky way is the nebula in which our system is situated.

See the treatises on this science by Gregory, Ferguson, Bonnycastle and Vince.

ASTROSCOPE, an instrument consisting of two cones, on the surfaces of which the constellations are delineated

ASTRUM, a constellation of stars; but the term is sometimes applied to the bright star in the mouth of Canis major.

ASYMPTOTE, in geometry, a line which approaches nearer to another continually, and never meets it. Properly, the term is appropriated to right lines, which continues to approach nearer to a curve.

ASYNDETON, in grammar, a figure which omits the conjunction in a sentence.

ATCHIEVEMENT, vulgarly *hatchment*, in heraldry, the arms of a person or family with all the ornaments appended to it.

ATHAMANTA, in botany, a genus of the pentandria digynia class and order in the natural method, ranking under the

the fluid mass which surrounds the earth, and partakes of its annual and diurnal motions. It is necessary not only to the comfort and convenience of life, but also to life itself, and to the constitution of matter in general.

Figure of the atmosphere. As the earth and the ambient parts of the atmosphere revolve uniformly together about the common axis, the different parts of both have a centrifugal force, whose tendency is more considerable and the centripetal less as the parts are more remote from the axis; therefore the figure of the atmosphere is that of an oblate spheroid, since the parts corresponding to the equator are farther from the axis than those at the poles.

Of the weight or pressure of the atmosphere. The pressure of the atmosphere sustains a column of quicksilver in the tube of the barometer, of about thirty inches in height; therefore the whole pressure of the atmosphere is equal to the weight of a column of quicksilver of an equal base and 30 inches; now as a cubical inch of quicksilver weighs nearly half a pound avoirdupoise, therefore the whole 30 inches or the weight of the atmosphere on every square inch of surface is equal to 15 lbs. Again, the pressure of the atmosphere balances a column of water of about 34½ feet high; and the cubical foot of water weighing 1000 oz. or 62½ lbs. 34½ times 62½, or 2158 lb. will be the weight of the column of water or of the atmosphere on the base of a square foot; consequently the 144th part of this or 15lb. is the weight of the atmosphere on a square inch, as before. From this it is computed that the pressure of this fluid on the surface of the earth is equal to that of a globe of lead of 60 miles in diameter. Hence also it appears that the pressure upon the human

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round berry, which is first green, but when ripe turns black, and contains a purple juice, and is full of small seeds. This species is remarkable for its poisonous qualities. A glass of warm vinegar will counteract its bad effects. 2, Atropa frutescens is a native of Spain, and rises to the height of 6 or 8 feet. The flowers are of a yellow colour, but are not succeeded by berries. 3. Atropa herbacea is a native of Campeachy, and grows to the height of two feet. The flowers are white. 4. Atropa mandragora, or the mandrake, which has been distinguished into the male and female. It is a native of the warm parts of Europe.

ATROPHY, in medicine, a disorder wherein the body, instead of receiving the necessary nutriment, wastes away incessantly.

ATTACHMENT, in law, the taking or apprehending of a person by a writ or precept; and is distinguished from arrest by lying sometimes on goods only, and sometimes on goods and persons.

ATTAINDER, in law, is when a man has committed treason or felony, and received sentence for the same. The children of one attainted for treason are incapable of being heirs to him or any ancestor; and if the attainted party be noble, his posterity are degraded.

ATTELABUS, a genus of coleopterous insects, or the beetle kind. Their larva devour the leaves, &c. of plants: but most of the species, of which, there are 34, penetrate into the plant, and subsist on the spongy parts. Previous to the pupa state, some species spin a silky web, and others form a ball, in which they remain during the second state.

ATTENUANTS, medicines which resolve the viscosity of the humours; promoting their circulation, and also the discharge of all noxious and excrementitious matter.

ATTIC, in architecture, a kind of building where the roof or covering is not seen. *Attic order* is a small order raised upon a larger one; or a pedestal, sometimes used for the conveniency of having a wardrobe or the like. The name attic is likewise given to the whole story into which this order enters. *Attic base*, is a beautiful base used by the antients in the Ionic and Doric orders.

ATTOLENS, in anatomy, a term applied to several muscles, otherwise called levators and elevators.

ATTRACTION, the principle by which all bodies mutually tend to each other. There are five kinds of attraction. The attraction of cohesion; of combination, or elective attraction; gravity; the magnetic attraction; and the attraction of electricity. The attraction of *cohesion* is that whereby the small particles of matter are kept together. By this principle bodies preserve their forms, and are preserved from falling in pieces; and it is probably owing to the various degrees of cohesion that some bodies are solid and others fluid. Two leaden balls having each a smooth surface, if strongly compressed together, will cohere almost as strongly as if united by fusion; and the like is nearly observed in two plates of glass. Small portions of quicksilver when brought near each other will run together, and assume the same globular appearance; and by the same law a vessel may be filled with water above the brim, and the fluid will rise in a convex form. Hence may be referred what is called capillary attraction.

The attraction of *combination* or chemical or elective attraction is in many respects like that of cohesion; for it seems to depend on the minute particles of bodies being brought nearly into contact with each other. Chemical attraction may be in fact only the attraction of cohesion acting in an unresisting medium, since its distinguishing characteristic is the disposition which bodies in solution indicate to unite with some substances in preference to others. The attraction of *gravitation* is that force by which distant bodies tend towards each other. By gravity a stone dropped from an height falls to the earth; by it the heavenly bodies are kept in their orbits; and hereby all terrestrial bodies tend towards the centre of the earth. The attraction of *magnetism* only differs from the last by its operations being limited to particular substances. The magnet is an ore of iron, and has the property of attracting certain portions of that metal within moderate distances. The attraction of *electricity* is also analogous to that of gravity in the property of acting upon bodies at a certain distance, but differs from it in its operation, being confined to a particular state of those bodies, or when excited by friction.

ATTRIBUTE, that which agrees with some person or thing; or a quality determining something after a particular manner.

ATTRITION, the rubbing or striking of bodies against each other, whereby their superficial particles are rubbed off.

AVALANCHES, a term used in Switzerland and Savoy for immense masses of snow which are precipitated from the tops of the mountains, and destroy every thing in their course.

AVANTURINE, in natural history, a yellowish sparkling stone resembling gold. An artificial sort is made by mixing sparkles of gold with glass while in a state of fusion.

AUBLETIA, in botany, a genus of the class and order polyandria monogynia; of which there are three species, all trees and natives of South America.

AUCUBA, in botany, a genus of the monoecia tetandria class and order. There is only one species, which is a tree, whose specific name is Japanica, from its being a native of that island. It is very hardy, and propagated by cuttings. The leaves are spotted with white or yellow, and it is altogether a beautiful shrub.

AUDITORY *nerves*, in anatomy, a pair of nerves which rise from the medulla oblongata, with two trunks, one called the portio dura, and the other portio mollis.

AVELLANE, in heraldry, a cross, whose quarters resemble a filbert-nut.

AVENA, *oats*, a genus of the digynia order, and triandria class of plants, in the natural method ranking under the fourth order, gramina. There are 25 species, the principal of which are: 1 Avena flatior, tall oat-grass. 2. Avena fatua, bearded oat-grass. 3. Avena flavescens, yellow oat-grass. 4. Avena nuda, the naked oat. 5. Avena pratensis, the meadow oat-grass. 6. Avena pubescens, the rough oat-grass. 7. Avena sativa, the common oat. The first six are natives of Britain.

AVERAGE, in commerce, is divided into three kinds: 1. Simple average consists in the ordinary expenses incurred for the ship, or merchandize alone, such as the loss of anchors, cables, sails, &c. 2. Large and common average are those expenses incurred for the security of merchandize and vessels, and borne both by ship and cargo. 3. Small averages, or the expenses for piloting a ship, a third of which must be borne by the ship, and two-thirds by the cargo.

AVERMENT, in law, an offer of the defendant to make good an exemption pleaded in abatement or bar of the plaintiff's action.

AVERRHOA, a genus of the decandria order, and pentagynia class of plants, in the natural method ranking under the 14th order, gruinales. There are two species: the principal is the Averrhoa carambola, called in Bengal the camrue or camrenga, grows to the height of 14 feet, and its leaves, on being touched, move perceptibly. They also sleep after sunset.

AUGIT, *silex augites*, a mineral of a deep olive colour; it is usually crystallized, but sometimes occurs in roundish fragments.

AVICIENNA, a genus of plants, of the tetandria monogynia class, the flower of which consists of a single petal; the fruit is a coriaceous capsule of one cell, containing one seed of an elliptic figure. There are three species, all natives of the West Indies.

AVIS, *bird*, among naturalists, the second class of animals. Birds are divided into six orders: viz. Accipitres or falcon kind; picæ, or pies; anseres or geese and duck kind; grallæ, cranes; gallinæ, the poultry kind; and passeres, small birds.

AUNE, a measure of length in France for measuring cloth, &c. At Rouen it is equal to an English ell; but varies in other places.

AVOIDANCE, in the canon law is when a benefice becomes void by the death, resignation, or deprivation of the incumbent.

AVOIRDUPOISE *weight*, a sort of weight used in England of which the pound consists of sixteen ounces. The proportion of a pound avoirdupoise to a pound troy is as 17 to 14.

AVOWRY, in law, is when a person distrained sues out a replevin, in which case the distrainer must avow or justify his plea.

AURANTIUM, the orange tree. See *Citrus*.

AURELIA. See *Chrysalis*.

AUREUS, a Roman gold coin, equal in value to twenty-five denarii.

AURICHALCUM. See *Orichalchum*.

AURICLE, in anatomy, that part of the ear which is prominent from the head, called by some authors auris externa.

Also the apendages of the he
distinguished into the right a

AURICULA. See *Primula*

AURIGA, the *waggoner*, in
a northern constellation con
stars according to Flamstead.
sented by the figure of an ol
with a goat and kids in his l
a bridle in his right.

AURORA, that faint light w
in the morning when the sun
degrees of the horizon.

AURORA *Borealis*, the *nort*
meteor which appears in t
part of the heavens, chiefly i
and frosty weather. It is in
yellow or red colour; and s
quent coruscations which s
from the horizon in a pyramid
shooting upwards to the ze
meteors have at times been m
than at others. They were s
land, or so little regarded tha
account of any remarkable o
1574 and 1716. This last was
the west of Ireland to Russi
nearly 30 degrees of longitud
about the 50th degree of lati
most the whole of the north
Father Boscovich determined
one to have been 825 miles
supposes that they are man
of miles high. In Sweden and
give a brilliant light; and
Bay it is equal to that of the
In the north-eastern parts of
meteors produce a hissing no
which frightens foxes and do
rora borealis as well as other
ors are now generally accou
cal phænomena.

AURUM, *Gold*, the most va
tals. Its specific gravity is 19
stance equals it in ductility an
ty: for it may be beaten into
that a grain of gold will cover
inches.

An ounce of gold upon silv
be extended more than 1300
nacity is so great that a gold
inch in diameter is capable
150.07 lbs. avoirdupoise. Go
volatilized but with a violent
therefore in chemical langua
exceedingly fixed. After be
to the utmost heat of Mr. Par
glass it did not lose any
weight. The reality of the
of gold by electricity was for s
puted, but it has been fully d
the experiments of Van Maru
made electric sparks pass th
wire suspended in the air it
was completely dissipated in
being collected proved to be
ide of gold. This combustio
not only in common air, but
wire was suspended in hydro
other gasses not capable of sup
bustion. The combustion of
effected by exposing gold leaf
of the galvanic pile.

AURUM *fulminans*. See

AURUM *potabile*, potable
preparation formerly used in

AUSTRALIS *Piscis*, a conste
southern hemisphere.

AUTOMATON, a machin

o form or conjugate others;
d *to be*. In our language the
b *am* supplies the want of

in anatomy, the arm-pit, or
der the upper part of the
, in botany, is the space be-
ms and leaves of plants.
n philosophy, a self-evident

eometry, a straight line in a
, about which it revolves to
; thus, if a semi-circle be
d its diameter at rest, it will
re, the axis of which is the

he world, in astronomy, is an
ght line, passing through the
earth from the north to the
about which the sphere re-
diurnal rotation.
onic sections, is the right line
s the section into two equal
; all its ordinates at right an-
xis of the ellipsis is determi-
the parabola indeterminate.
le and hyperbola there are
arabola one.
nics, the axis of a balance
bout which it moves. Axis
is a right line parallel to
passing through the centre,
a pendulum vibrates. *Axis*
is one of the five mechanical
isting of a peritrochium or
moveable with it.
optics, is that ray which falls
rly upon the eye, and con-
sses through the centre of it.
mean axis is a right line drawn
t of concourse of the two op-
rough the middle of the right
oins the extremity of them.
is a right line joining the
t of its two opposite surfaces.
dence is a right line perpen-
e point of incidence to the

is scarcely able to see objects in the day. It lives chiefly under ground, feeding on worms and insects, which it extracts by a long and slender toe.

AYENIA, *in botany*, a genus of the pentandria order and gynandria class of plants, in the natural method ranking under the 37th order columniferæ. There are 4 species all natives of the West Indies.

AZALEA, the American upright honey suckle, a genus of the monogynia order and pentandria class of plants: in the natural method ranking under the 18th order, bicornes. There are 7 species, the principal of which are, 1. Azalea nudiflora, or red American upright honey suckle, which grows to the height of 12 feet. The flowers are red. 2. Azalea viscosa, bears a white flower. It is a shrub. 3 Azalea pontica is a native of Pontus, and bears beautiful fragrant yellow flowers.

AZIMUTH, in astronomy, is an arch of the horizon intercepted between the meridian of the place and the vertical circle passing through the centre of the object, which is equal to the angle of the zenith formed by the meridian and vertical circle.

The *magnetical azimuth* is an arch of the horizon intercepted between the vertical circle passing through the centre of an heavenly body and the magnetical meridian. *Azimuth compass* is a marine instrument for discovering the magnetical amplitude or azimuth of the sun or a star. *Azimuth dial* is that which has its style at right angles to the plane of the horizon. *Azimuth circles* are great circles of the sphere intersecting each other in the zenith and nadir, cutting the horizon at right angles.

AZOTE, *in chemistry*, a substance which is a peculiar ingredient of animal matter, the basis of nitric acid and one of the constituents of volatile alkali. Pure azote is known only in the form of gass: and is then the same with the philogisticated air of Scheele and Priestley, the atmospherical

B

B the second letter of the alphabet, was used by the Hebrews and Greeks as a numeral to signify 2; but with the Romans it denoted 300, and with a dash over it 3000. The same people also used B for Brutus, B F for *bonum factum*. Among the old chemists B stood for mercury; in music B represents the tone above A, likewise bass; B C is basso continuo, or thorough bass. B.A. stands for bachelor of arts; B.L. bachelor of laws; and B.D. bachelor of divinity.

BABOON, see *Simia*.

BACCHARIS, *ploughman's spikenard*, a genus of the polygamia superflua order and syngenesia class of plants; in the natural method ranking under the 49th order, compositæ discoides. There are nine species, all natives of warm climates: The chief are, 1. Baccharis halimifolia or Virginia groundsel-tree, a native of North America. It grows to the height of about seven feet, and is propagated by cuttings. 2. Baccharis ivæfolia, or African tree-groundsel, a native of the Cape of Good Hope and South America. It is less than the former, and is usually kept in green-houses.

BACCHIUS, in antient poetry, a foot consisting of one short and two long syllables.

BACILLARIA, a genus of vermes infusoriæ. The body consists of straw-like cylinders parallel to each other.

BACK *the sails*, in marine language, is to bring them to the mast that the ship may move astern.

BACK-STAFF, an instrument formerly used on board ships to take the sun's altitude.

BACOPA, a genus of the pentandria monogynia class and order of plants; There is only one species, which is an aquatic plant of Cayenne.

BACTRIS, a genus of the class and order monoecia hexandria. It is of the palm kind; and there are two species natives of Carthagena.

BACULE, in fortification, a kind of portcullis.

BADGER, see *Ursus*.

BADIAGA, an aquatic plant resembling a sponge.

BADIANE, the seed of a tree which grows in China, and sometimes used to give the tea an aromatic flavour.

BADIGEON, a mixture of plaister and free stone, used by statuaries to fill up little holes.

BÆCKEA, a genus of the octandria order and monogynia class of plants. The only species is a native of China.

BÆOBOTRYS, a genus of the pentandria monogynia class and order of plants. There is but one species a native of Zanna in the South Seas.

BAG, in farriery, a remedy to restore a horse to his appetite. It consists of an ounce of assa fœtida, and the same quantity of powder of savin, put into a bag and
tied to the bit, keeping th
two hours.

BAGUETTE, in arch
round moulding, so ca
sembling a ring.

BAHAR, or BARRE,
weights used in the E
great bahar is about 5 cwt
dupoise; the little baha

BAIL, in law, the se
person arrested upon an
or criminal, sureties be
appearance at a prope
Common bail is a form
after personal service of
tice to appear upon the d
bail is when two or mor
take in a certain sum to
ant's appearance at the

BAILMENT, in law,
things to another to be
the bailer, or to the use
a third person.

BAILIFF, a keepe
whence the sheriff is c
crown, because he is to
his county. An officer w
&c. is also called a bai
is made use of to den
manager of a farm or
places the chief magistra
liff; and in Scotland, it
alderman and a judge.
officer appointed in por
dues for mooring, &c.

BAILIWICK, a liber
the sheriff of the county.

BALÆNA, the whal
mammalia class, and o
The balæna instead of
plate on the upper jaw
tula or pipe for throwin
are four species, viz.
the pike-headed whale,
ble pipe in its snout, thre
ridge on its back. It
northern seas, and take
shape of the nose whic
and sharp-pointed than
2. Balæna musculus h
its front, and three fin
jaw is wider than the u
the shores of Scotland.
cetus, the great Greenl
fin on the back. It is
ninety feet in length.
third of the size of the f
lip is broader than the
consists of a soft spon
yield above five barrel
not wider than four inc
of the head are two ori
it spouts water to a
and with great noise.
wards the back of the
hearing in the whale is
the external ear is no
is termed whalebone a
jaw, and consists of th
some of which are fou

years they are named
that time they are called
what age they live is un-
d of the great whale is
lled the medusa or sea-
ena physalus, or fin-fish,
from the common whale
ack, near the tail. It is
of the former, but more
e is of little value, and the
siderable. It is a fierce
n which account the sea-
; but the Greenlanders
mation for the flesh. It
h more violence, and to
than the common whale.
ngs, and other small fish.
a terrible enemy in the
ch wounds it in various
e enormous animal en-
e it with its tail, but ge-
effect. There is also a
attaches itself to the body
d feeds on the fat, whence
whale louse. But the
nemy of the whale except
or killer. A number of
he animal as dogs attack a
ne tear it with their teeth
t behind it, till the whale
ien they seize upon its
the only part they devour.

ballance, in mechanics,
le powers by which the
rence of weight of bodies

trade, in commerce, the
n the value of the com-
of foreigners and that of the
xported to other nations.

ini, multivalved shells
ow in clusters on the shell
l fish.

, or **BALDAQUIN**, in
uilding resembling a cano-

sive materials.

Sky balls, are those which being cast out of mortars ascend to a great height and burst like rockets.

BALL *vein*, in mineralogy, a name given by the miners of Sussex to a sort of iron ore in that county.

BALL and SOCKET, a brass instrument having a perpetual screw, so as to move horizontally, vertically, and obliquely. It is used for gauging, surveying, and astronomical instruments.

BALLAST, stones, gravel, iron, &c. laid in a ship's hold to enable her to keep a proper balance in the water.

BALLISTA, a military engine used by the antients in besieging places, to throw stones, darts, and javelins.

BALLOON, or *Ballon*, a hollow body. Among chemists a balloon is a round short necked vessel, used to receive what is distilled by means of fire; in architecture it is a round globe on the top of a pillar; among the French it denotes twenty-four reams of paper. See *Air balloon*.

BALLOTA, the *white horehound*, a genus of the gymnospermia order and didynamia class of plants; in the natural method ranking under the 42d order, verticillatæ. It is a weed which grows on the sides of banks. There are five species.

BALLUSTRADE, in architecture, a row of ballusters joined by a rail, used for staircases, &c.

BALNEUM, among chemists, a vessel filled with sand, water, &c. in which another is placed that requires a gentler heat than that of naked fire.

BALSAM, a resinous substance, flowing from certain plants. The principal are benzoin, storax, stylax, balsam of Peru, balsam of Tolu.

BALSAMICS, in pharmacy, medicines of a softening, healing and cleansing quality.

BALTIMORA, a genus of the polygamia

defraud: departing from the dwelling-house with the same intent or to delay; beginning to keep house that is, being denied to a creditor; voluntary arrest, suffering an outlawry; escaping from prison; fraudulent procurement of goods to be attached or sequestered; making a fraudulent conveyance; being imprisoned for debt two months, &c. No commission can issue unless upon the petition of a creditor to whom the bankrupt is indebted 100l. of two or more, being partners, whose debt is 150l. and of three or more to 200l.

BANKSIA, a genus of the monogynia order, and tetandria class of plants. There are eight species, natives of New Holland.

BANN or **BAN**, in the feudal law, a solemn proclamation of any thing; hence the custom of asking *banns*, or giving notice before marriage. *Bann of the empire*, was an imperial proscription by which persons were cut off from the immunities and protection of the empire.

BANNER, a square flag or the principal standard belonging to a prince.

BANNERET, an ancient order of knighthood, the form of conferring which was this; on a day of battle the candidate presented his flag to the king or general who cutting off a skirt, and making it into a square returned it again. This order after having been disused since the reign of Charles I. was revived in the person of Sir William Erskine in 1764; and sir Henry Trollope is the last created knight banneret.

BANNEROLS, in heraldry, small flags used at the funerals of distinguished persons.

BANQUET, in the menage, a small part of the branch of the bridle under the eye.

BANQUET or **BANQUETTE**, in fortification, an elevation of earth forming a path which runs along the inside of a

Ka, Therefore all
ble.

BARBICAN, a watch tower ing an enemy at a distance: ward defence or fortification castle. In architecture, it de or opening made in a wall pass.

BARBETED *leaf*, in botany, terminates in long hairs.

BARBE, a Barbary horse teemed for its beauty, strength, ness; also an old word armour. In the military art, *barbe* means to fire the cannon parapet.

BARBED and *crested*, in appellation given to the comb o a cock when of a different the body. A barbed-cross is extremities are like an harpoon.

BARBET, a genus of birds the tropical climates. They than a lark and are of differe See *Bucco*.

BARBLES, or **BARBS**, in knots of superfluous flesh in of a horse's mouth.

BARGE-COURSE, a term use layers for that part of the tiling jects without the principal rafte

BARILLA, a Spanish alkaline in making of glass. It is the veral plants of the kali kind.

BARK, the outward part of navigation it means a vessel masts, the last of which is small mizen mast of a ship.

BARK, *Jesuit*. See *Cinchona*.

BARLERIA, a genus of the mia order and didynamia class ranking in the natural method 40th order personatæ. There species, all American plants.

ıalf of an inch bore, and her-
led.
ethod of filling the tube is as
ır the finestmercury into the
n two inches of the top, and
with the sealed end lowest in
osition over a charcoal fire,
mercury becomes hot, the
ace of the tube will be cover-
bubbles; which enlarge by
one another and ascend to the
of the tube, where meeting
part of the fluid they are
d being formed into a con-
k entirely escape. When the
e tube is sufficiently heated,
ittle and little, through its
. When the mercury boils
strike violently against the
be and completely expel the
e is then fixed in a wooden
a scale of inches at the upper
measured from the surface
ry in the cistern.
neter should be always at-
barometer, and by the side
of correction to shew how
to be added to, or subtracted
ght of the mercury in the ba-
the degree of temperature.
rules for judging the weather
ment are these.
of the mercury presages fair
its falling foul. 2. In very
he falling o' the mercury fore-
. 3. In winter the rising of
presages frost; and in frosty
e mercury falls three or four
w will follow. 4. When foul
ens soon after the falling of
it will be of short duration:
trary, but little fair weather,
s fair shortly after the rising
y. 5. In foul weather when
rises much, and high, and
wo or three days before the
s quite over, expect a con-
ir weather. 6. In fair wea-
he mercury falls much and
ontinues two or three days
mes, expect much wet and
7. The unsettled motion of
enotes uncertain and change-

common barometer there
rived to increase the scale,
ore sensibly small changes,
l barometer; the horizontal
rectangular barometer; the
eter, the marine barometer
a portable barometer for
heights of mountains, &c.
degree of nobility next to
unt. *Barons of the cinque*
bers of the house of com-
by the ports so called.
l FEME, in law, a term used
d wife. In heraldry baron
hen the coats of arms of a
wife are borne per pale in
tcheon, the former being on
1 the latter on the sinister

an hereditary title of ho-
ow nobility, and above that
The baronets of Ireland were
1619; and those of Nova

BARONY, the honour and territory which gives title to a baron.

BARRETRY, in marine law, is when the master of a ship cheats his owners, by embezzling the cargo.

BARREL, a liquid measure, containing of wine measure 31½ gallons; of beer measure 36 gallons. It is also a weight of several merchandizes; thus, a barrel of Essex butter is 106lbs. and of Suffolk butter 256lbs. A barrel of herrings should contain 32 gallons wine measure; the barrel of salmon, and the barrel of eels 42 gallons. The barrel of soap must weigh 256lbs.

BARREL, in anatomy, a cavity behind the tympanum of the ear.

BARRERIA, a genus of the syngenesia monogamia class and order of plants. Calyx five-toothed; corolla five-parted; style short; stigma trifid. The only species is a lofty tree which grows in Guiana.

BARRICADE, in fortification, a defence consisting of barrels, &c. filled with earth, stones, &c. or trees placed to resist the enemy's shot; but generally it is made of pales crossed with battoons bound with iron. On board ship it is a rail across the forepart of the quarter deck.

BARRIER, in fortification, a fence made at a passage and retrenchment, to impede either horse or foot.

BARRINGTONIA, a genus of the polyandria order, and monadelphia class of plants. Female calyx diphyllous above with a drupa; and the seed a quadrilocular nut. There is only one species which is a native of China and Otaheite.

BARRISTER, a person empowered to plead the cause of clients in courts of justice. The outer barristers are those of five years standing, and plead without the bar. The inner barristers are those who being king's counsel, serjeant, &c. are allowed to plead within the bar.

BARROW, a term applied to those mounds of earth raised over the bodies of persons of eminence in ancient times.

BARRULET, in heraldry, the fourth part of the bar.

BARRULY, in heraldry is when the field is divided bar ways, or across from side to side into several parts.

BARRY, in heraldry, is when an escutcheon is divided bar-ways across into an even number of partitions of two or more tinctures interchangeably disposed. *Barry bendy* is when an escutcheon is divided evenly, bar and broadways by lines drawn transversely and diagonally, interchangeably varying the tinctures. *Barry pily* is when a coat is divided by several oblique lines from side to side.

BARTER, in commerce, the exchanging of one commodity for another. Multiply the given quantity and rate of one commodity and this product divided by the rate of the other commodity will give the quantity, or divided by the quantity will give the rate.

BARTSIA, *painted cup*, a genus of the angiospermia order, and didynamia class of plants, ranking in the natural method under the 48th order, personatæ; calyx bilbous, emargined and coloured; corolla less coloured than the calyx, and the upper lip longer than the under; there are five species: the principal of which are, 1. *Bartsia alpina*, the mountain eye-bright cow wheat, It is a native of Britain. and grows near rivulets. 2. *Bartsia viscosa*, marshy or yellow marsh eye-bright. It has an erect stalk, downy, and unbranched; leaves sessile, spear-shaped, and viscous; flowers yellow, and the plant dries black. It grows in Cornwall.

BARYTES. in mineralogy, an earth discovered in 1774 by Scheele, who gave it the name of terra ponderosa; and Kirwan that of barytes, by which it is now generally called.

It has a harsh caustic taste, and is a strong poison. Barytes tinges vegetable blues green, and decomposes fixed bodies. It has no action on metals; but it combines with several of the metallic oxydes.

BASALTES, in natural history, a kind of stone of a fine texture, resembling polished steel. It is never found in strata, but standing up in the form of regular angular columns composed of a number of joints fitted to each other with the greatest exactness. The noblest specimen in the world, is that called the Giant's Causeway in Ireland, where it rises far up the country, runs into the sea, and rises again on the opposite shore. Basalt is used in building and paving, also as an ingredient in the manufacture of glass bottles; when calcined and pulverized it makes excellent mortar, which hardens under water.

BASE, in geometry, the lowest side of the perimeter of a figure: thus, the base side of a triangle is properly the one parallel to the horizon. The *base of a solid figure* is that on which it stands. *Base of a conic section* is a right line in the hyperbola and parabola arising from the common intersection of the secant plane and the base of the cone.

BASE, in architecture, is the lower part of a column and pedestal. The base of a column is that part between the shaft and the pedestal if there be one, otherwise between the shaft and plinth.

BASE, in *fortification*, is the exterior line of the polygon or the imaginary line drawn from the flanked angle of a bastion to the opposite angle. In gunnery the base is the least kind of ordnance, the diameter of whose bore is 1½ inch, weight 200lbs. length 4 feet, load 5 lbs. shot 1½lb. and diameter 1⅛ inch.

BASE *line*, in perspective, the common section of a picture, and the geometrical plane.

BASE or BASIS, in chemistry, denotes the species of salts which differ with regard to the acid, but agree as to the alkali, earth, or metallic oxyd which they contain.

BASE, in law, is applied different ways. Base estate is such as base tenants possess. Base tenure is the holding of lands by villenage or other customary services. Base fee is to hold in fee at the will of the lord. Base court is one not of record.

BASELLA, *climbing nightshade*, a genus of the pentandria class, and trigynia order of plants; ranking in the natural method under the 12th order holoraceæ. Calyx none; corolla seven cleft; seed one. There are four species, the principal of which are, 1. Basella alba, with oval leaves and small flowers and fruit. It climbs to a considerable height, and sends forth numerous branches. 2. Basella rubra, with
red leaves and simple foot-stal
thick, strong, succulent stalks, an
of a deep purple colour.

BASEMENT, the lower story of
ing when it is in the form of a
with a base or plinth, die, and co
plat band.

BASIL, among joiners, is the slop
of a chisel, or of the iron of a plan

BASILICA, in anatomy, the
part of the axillary vein, run
whole length of the arm.

BASKETS are made of rushes,
or willows, which last, according
growth, are called osiers and
When the osiers are cut; those
for white work are stripped of th
while green by a sharp instrumen
into a block. Before they are work
must be soaked in water to mak
flexible. Hampers and other coa
are made of osiers without any
preparation except soaking. The
Britons were famous for their ing
making baskets which were high
at Rome. As a measure *bask*
an uncertain quantity.

BASON, a term used by glass
for a vessel of copper, iron, &c.
they grind convex glasses; amon
it denotes the round iron mould
they form the material for their h
a leaden one for the brims, havi
in the middle of a diameter suff
admit the block.

BASS, in music, that part of a
which is most heard, and consi
deepest sounds. Also the princ
of a musical composition, and the
tion of harmony. *Thorough ba*
harmony made by the bass viols
boes, continuing to play both w
voices sing, and the other instrum
form their parts, and also filling
intervals when any of the other p
Counter bass is a second or d
where there are several in the s
cert.

BASSIA, in botany, a genus o
decandria class, and monogynia
plants; whose characters are, c
driphyllous; corolla octofid, a
flated; stamina sixteen; and dr
quespermous. There are three
natives of Malabar.

BASSOON, a wind instrume
with a reed, furnished with ele
It is used as a bass in a concer
boys, flutes, &c.

BASSORIA, a genus of the p
monogynia class and order.
cleft, spreading with a short tu
ovate, knotted, and many seed
only species is a native of Gui

BASSO-RELIEVO, or BASS-
piece of sculpture in which the
not project far beyond the plan
they are formed. The represent
wrought are said to be done i
relievo; and when the work is
little raised, it is called low
when a piece of sculpture or
its figure prominently raised,
bold, and the relief said to be

BASS-VIOL, a musical instr
sembling a violin but larger.
struck with a bow, has the sam
of strings, with eight stops, whi

o semi-stops. It has a no-
ad.
one born out of wedlock
illegitimate. The incapacity
nsists in this, that he can-
any one, nor can he have
his own body. A bastard
t, be made legitimate by
ent.
, in heraldry, is denoted on
by crossing the same with a
raverse from left to right.
in fortification, a mass of
th sods, brick or stone, pro-
n a rampart. It consists of
two flanks; the former in-
t of the bastion, and their
he salient angle; and the
wo faces to the two flanks
angles called the shoulders
nd the union of the two
the flanks to the two cur-
angle of the flanks. The
astion must exceed 60 de-

r BATOON, in heraldry, a
aving only one-third of the
th.
uperstitio.
OR, in the universities, means
e in arts, law, medicine, or
re any one can be admitted
of batchelor of arts at Ox-
have been a student four
e years more he may take
aster of arts; and in seven
commence batchelor of di-
ambridge the degrees are
in the same way, except
id physic, in either of which
s degree may be taken in

tany, a genus of the tentan-
d dioecia class of plants:
of the male is four ways im-
and corolla none; the fe-
r is ovate, the involucrum
lyx and corolla wanting;
e and sessile; berries con-
r seeded. It is a native of

N, a body of infantry gene-
g 600 or 1000 men; but a
ent has sometimes 1200, in-
.
cantling of wood from two
road, about one inch thick,
erminate length.
cannonade of heavy ord-
e first or second parallel of
To *batter in breach* im-
e of many pieces directed
the revetement from the

ny place where cannon or
ounted to attack the forces
or to batter a fortification.
y is a method of firing with
ty of powder and a little
just to fire over the para-
means the shot will roll
site rampart, dismounting
destroying the troops. An
ry is one which has a para-
the platform being only the
orizon made level. *Breach*
s are those which are sunk
to make a *breach in the*
angles of the bastion and

favelin. *Cross batteries* are such as play on a work obliquely. *Enfilading batteries* are those that sweep the whole length in a straight line, or the face or flank of a work. *Redan batteries* are those which flank each other at the salient and reentrant angles of a fortification. *Direct batteries* are situated opposite to the object of attack. *Reverse batteries* are those which play on the rear of the troops appointed for the defence of the place. *Glancing batteries* are those whose shot after striking an object at an angle of about 20 degrees, glances away and recoils to some adjacent parts. *Joint* and *camarade* batteries are when several guns fire on the same object at the same time. *Fascine and gabion batteries* are batteries made of those machines where rods are scarce and the earth sandy.

BATTERY, in law, is the striking or offering violence to another person for which damages may be recovered.

BATTLEMENTS, in architecture, are indentures or notches in the top of a building or wall to look or fire through.

BAUHINIA, *mountain ebony*, a genus of the monogynia order, and decandria class of plants, ranking in the natural method under the 33d order lomentaceæ. There are thirteen species, all trees and shrubs, propagated by seeds. The principal are, 1. Bauhinia aculeata with a prickly stalk. It is common in America and the West Indies, where it is called the savin tree. 2. Bauhinia acuminata, with oval leaves. It is a native of both the East and West Indies. The wood is hard with black veins. 3. Bauhinia divaricata, with oval leaves, whose lobes spread different ways. It grows in Jamaica. 4. Bauhinia tomentosa, with heart-shaped leaves, is a native of Campeachy, and grows to the height of fourteen feet.

BAY, in geography, an arm of the sea, shooting up into the land and terminating in a nook.

BAY *tree*, see *Laurus*.

BAYONET, a short broad dagger, fixed to the bore of a firelock.

BAYS, woollen stuff having a long nap. It is made in a loom in the same manner as flannel, and is chiefly manufactured in Essex.

BAZENDGES, a vegetable substance used by the Eastern nations in dying scarlet

BDELLIUM, a resinous gum resembling myrrh produced in the Levant. Its colour is dusky, and the taste bitter. It burns readily, and is soluble in alcohol and water. It was formerly regarded as a stimulant, but is now disused.

BEACON, a signal to give warning against rocks, shelves, an enemy, &c. Beacons formerly were made by lighting fires on elevated places, or putting pitch barrels upon long poles.

BEAD, in architecture, a round moulding on the edge of a piece of stuff in the Corinthian and Roman orders. Also an ornament made of glass, &c. for necklaces. *Bead proof*, among distillers, is a fallacious mode of determining the strength of spirits from the continuance of the bubbles or beads raised on the surface.

BEAGLE, see *Canis*.

BEAK, the bill or nib of a bird. In architecture, beak is the small fillet on the head of a larmier, which forms a canal and makes a kind of pendant.

BEAKED, in heraldry, a term for the beak or bill of a bird.

BEAM, in architecture, the largest piece of timber in a building, which lies across the walls, for the purpose of supporting the principal rafters of the roof, and into which the feet of the rafters are framed.

BEAMS of a ship, are the great cross timbers from one side to the other. The main beam, is next the main mast; but the principal is called the midship-beam.

BEAM-COMPASS, an instrument of wood or brass, having sliding sockets, in which are steel or pencil points, used for describing large circles.

BEAM, in heraldry, denotes the main horn of a hart or buck

BEAM *filling*, in building, is the filling up of the vacant space between the raison and roof, with stones or bricks.

BEAM *of an anchor*, is the longest part of it, or the shank. *Beam* also denotes the horizontal bar of a pair of scales; and sometimes the whole apparatus for weighing. *Beam of a plough*, is that in which all the parts of a plough tail are fixed.

BEAM, or ROLLER, among weavers, a wooden cylinder placed on the back part of the loom of those who work with a shuttle.

BEAN, see *Vicia* and *Phaseolis*.

BEAR, see *Ursus*.

BEAR, in astronomy, the name of two northern constellations, called Ursa major, and Ursa minor.

BEAR, an inferior species of barley, cultivated in Scotland and Ireland, and the northern parts of England.

BEAR, in heraldry, is a term used for the charges or ordinaries borne by any person in his escutcheon.

BEAR'S BREECH, see *Acanthus*.

BEARER, in architecture, a post or brick wall trimmed up between the two ends of a piece of timber, to prevent its bearing with the whole weight at the ends alone.

BEARING, in navigation and geography, the situation of one place from another, with regard to the points of the compass. In sea-language, bearing is applied to a ship when she approaches the land. When she sails more before the wind, she is said to bear up; and to put her right before the wind, is to bear round. To keep her from the land, is to bear off, and when a ship to windward comes under the stern of another, she is said to bear under her lee.

BEAVER, see *Castor*.

BED, in masonry, is a course or range of stones; and the joint of the bed is the mortar between two stones, placed over each other.

BED of the carriage of a cannon, is a thick plank, which lies immediately under the piece.

BEDA, a sacred book of the religion and laws of the brahmins in Hindostan; called also the *veda*.

BEE, see *Apis*.

BEECH, in botany, see *Fagus*.

BEET, see *Beta*.

BEETLE, a common name for all insects furnished with shelly wing cases: those which have them divided by a *straight suture*, are properly beetles, and *belong to* the coleoptera order. The scarabæi are beetles in the
of the word.

BEGONIA, a genus of
monoecia polyandria class
whose characters are: the
no calyx, but many petals;
of the rosaceous kind, and
several petals in a circular
liated cup, which becomes
ted capsule. containing
There are thirteen species,
plants.

BEJARIA, a genus of plant
candria monogynia class and
is seven cleft, petals seven;
teen; berry seven-celled
seeded. The species are
and the other a shrub,
Grenada.

BELAY, in marine lan
make the ropes fast in their

BELEMNITES, in natural
sils composed of thin coats
circling one another. They
conical and hollow in the
times filled with spar, pyrites
shells. They are of various
found in all kinds of strata.

BELL, a musical instrumen
sion. The metal of which bel
is a composition of tin or
copper. The parts of a bell ar
or barrel, the clapper, and the
non, on which it hangs. The
bell consists in a vibratory
parts, much like that of a
Bells were invented in the
and introduced into churches
900. The first tunable bells
were set up at Croyland Abbey

BELLA DONNA, see
Atropa.

BELLES LETTRES, a term
the French, and applied to polit
in general, but without any
meaning, or prescribed limits.

BELLIS, the daisy, a genus
genesia class, and polygam
order of plants; in the natu
ranking under the 49th order,
discoidæ. There are two
many varieties. 1. Bellis
annual plant, which grows
and the hilly parts of Italy. 2.
rennis, or common daisy grow
in pasture lands. The varie
garden daisy are the red and
double variegated; the childi
and chicken daisy, and the
daisy.

BELLIUM, in botany, a
syngenesia polygamia superflua
order. There are two species,
Italy and the Levant, both
daisy.

BELLONIA, a genus of the
order, and pentandria class
Flower wheel-shaped; germen
receptacle of the flower which
becomes a turbinated seed-
in a point having one cell filled
seeds. There are two species.
aspera or shrubby bellonia,
mon in the West Indies. 2. Bellon
a native of Hispaniola.

BELLOWS, a machine so cont
expire and respire the air alte
enlarging and contracting its
The action of bellows depend

id which the wife has after
decease for her dower ac-
custom of the manor.
raldry, one of the nine ho-
aries containing a third part
en charged and a fifth when

in marine language, is the
to any thing; as bend the
en it to the anchor; bend the
them to the yard, &c.
a ship, are the same with
ed wales; the external
ip's side.
a church endowed with a
he performance of divine
revenue itself assigned to
il person for the performance
worship.
a resin, brought from the
ticularly from Siam and the
and Sumatra. It is brittle;
ed emits a fragrant smell.
alcohol, but not in water.
id is extracted from it.
e barberry, or pipperidge
of the monogynia order
class of plants. Calyx six
ix, with two glands at the
none; the berry has two
are four species. 1. Ber-
ws to the height of three or
erberis illicifolia, having
olm oak. 3. Berberis Si-
low shrub. 4. Berberis
common barberry which
hedges in many parts of
cultivated for its fruit
pickle. Its height is from
, with many stalks. The
low, and succeeded by an
h are at first green, and
ne red. There are two or
of this shrub.
, a fragrant essence extrac-

called by lapidaries aqua marina. It is found in the East Indies, Peru, Siberia, and Tartary. It has a brilliant appearance and is generally transparent. By analyzing this stone Vauquelin discovered the earth called by him glaucina.

BERYL-CRYSTAL, in natural history, a species of what Dr. Hill calls ellipomacristyla or imperfect crystals. Its form is that of a long slender column, tapering towards the top, and irregularly hexangular. It is transparent, and of a pale brown colour.

BESANT or **BEZANT**, a gold coin of an uncertain value, struck at Byzantium by the Christian emperors; whence the gold offered by the king at the altar is called by this name.

BESANTS, in heraldry, are round pieces of gold borne on coats of arms.

BESLERIA, a genus of the angiospermia order, and didynamia class of plants. There are six species; the principal of which are, 1. Besleria cristata, with stalks growing single and a five-leafed involucrum. The calyx is scarlet; and the corolla yellow. 2. Besleria lutea, with simple footstalks growing in clusters, and spear-shaped leaves. The flowers are yellow. 3. Besleria melittifolia, with branching footstalks and oval leaves. They are all natives of America, and in this country are stove plants.

BETA, the *beet*, a genus of the pentandria digynia class and order of plants; in the natural method, ranking under the 12th order holoraceæ. The calyx has five leaves; corolla none; seeds kidney-shaped, and within the base of the calyx. The species are, 1. Beta cicla, or the root of scarcity, whose virtues have been magnified beyond reason. The beta hortensis or common white beet is a variety of this; and cultivated in gardens for the sake of its leaves, which are used in soups. 2.

BETONICA, *betony*, a genus of the gymnospermia order, and didynamia class of plants; in the natural method ranking under the 42d order, verticillatæ. The calyx is awned, upper lip of the corolla ascending and flattish; and the tube cylindric. There are seven species; the chief of which are, 1. Betonica orientalis, the oriental betony. 2. Betonica stricta, the greater Danish betony. 3. Betonica incana, the hoary Italian betony, which has a flesh-coloured flower. 4. Betonica officinalis. This is a low plant, and grows in woods and shady places. The roots of the betony taken in a small dose, vomit and purge violently.

BETULA, the alder-tree or birch, a genus of the tetandria order and monoecia class of plants, ranking in the natural method under the 50th order, amentaceæ. The male calyx is monophyllous, trifid, and biflorus; the corolla parted into four segments: female calyx monophyllous, trifid and biflorus; seeds winged on both sides. Of the species, which are fifteen, the principal are, 1. Betula alba, or common birch tree. It grows to a considerable height and size, in a good soil and situation. 2. Betula alnus, or the alder tree, is of a straggling growth. It flourishes in swampy places, the roots poison the herbage and rot the soil. 3. Betula lenta, the Canadian birch, grows to the height of above sixty feet. There are four varieties. 4. Betula nana, the dwarf birch, with roundish leaves, grows naturally in the northern parts of Europe, and on the Alps. 5. Betula nigra, or the black Virginian birch tree, which grows to the height of sixty feet and upwards. The leaves are broad, and the branches are spotted. There are several varieties.

BEVEL, among builders, a kind of square, moveable on a centre, to be set to any angle. It is used for sweeping an arch or vault. It may in some measure supply the place both of the common square and mitre. *Bevel-angle* is any angle except one of 45 or 90 degrees.

BEVELLING, in ship-building, the method of hewing timber with a regular curve, according to a mould laid on one side of its surface.

BEVILE, in heraldry, a thing broken or opening like a carpenter's rule.

BEZOAR, an antidote or medicine intended to expel poison. The *oriental bezoar* is a round stone, varying in size from a pea to a middling walnut. It is of an olive or greenish brown colour, and smooth and glossy on the surface. When broken it is found to consist of many coats of stony matter, formed upon a piece of wood, or the seed of a fruit. This drug is of great price, but seems to possess a higher name than real value. It comes from Persia and other parts of the East, and one kind is found in Mexico. Bezoars are supposed to be concretions formed in the stomach or intestines of different animals.

BICE, among painters, a blue colour, prepared from the lapis armenus. It bears the best body of all bright blues used in common work, but inclines a little to sandy, and therefore requires to be well *ground*.

BICEPS, in anatomy, the
veral muscles.

BIDENS, in botany, a genu
genesia polygamia class and
in the natural method under th
compositæ oppositifoliæ. Rece
aceous; the pappus has ere
awns; the calyx imbricated.
14 species, but the only one
mention is the bidens tripa
grows in England on the side
and rivulets. Its height is
it bears yellow flowers. A dec
plant with alum gives a yell
yarn.

BIDON, a French liquid
about 5 quarts English wine m

BIENNIAL *plants*, are those
duration. They consist of
flowering plants.

BIGAMY, in law, is whe
marries a second time before
the first wife or husband. Fo
offence was punishable with d
is now felony with benefit of

BIGNONIA, *trumpet flower*
jessamine, a genus of the angiosp
and didynamia class of plants,
tural method ranking in the
personatæ, calyx quinquefid
formed: corolla bill shape
throat, quinquefid, and belli
neath; siloqua, bilocular, se
There are 27 species, the chief o
1. Bignonia catalpa, a native
America. It grows to the heig
and has a beautiful appearan
nonia capreolata, or tendril
also a native of North Ame
climber, and bears yellow
Bignonia radicans, the climbin
bignonia, is a native of
Canada. It grows to the he
40 feet, and bears clusters of
ers of the shape of trumpets.
ming bird delights to feed on
ers. 4. Bignonia sempervire
green climbing Virginia bi
native of North America.
are yellow and trumpet sha
nonia unguis, the claw bigno
ciduous climber is a native
India islands. 6. Bignonia
This is a shrubby climbing pl
native of Japan. The flowers

BILGE, the bottom floor of
ship is said to be bilged wh
part of her bottom beat in by
rock. Bilge water is that which
floor.

BILE, a yellow acrid juice
from the blood in the liver,
the porus biliaris and gall bl
whence it is discharged by th
duct into the duodenum.

BILIOUS *fevers* are those
from the excess or bad quali
bile.

BILL, an iron instrument in
a crescent used by plumber
makers and gardeners.

BILL, in law, is a written d
expressing the wrong the compl
suffered, or some fault commit
a particular law or statute.
addressed to the chancellor, o
who have jurisdiction. In crim

order: or to bearer. If
payable to bearer it is as-
livery only; but if to order
sferred by indorsement and
romissory note, or note of
gement in writing to pay
at a certain time to a person
erein, or to his order, or to
this also is assignable and
bills of exchange are foreign
he first when drawn by a
ad upon his correspondent
r the contrary: and inland
rties reside in the kingdom.
an account of goods entered
s-house both inwards and
ll of lading is an acknow-
ged by the master of a ship,
account of the goods re-
d from a merchant with a
liver them. *Bill of sale* is
given by a person who bor-
another empowering him
ion of certain goods, and to
: sum borrowed is not re-
est in the stipulated time.
t is a license granted at
use to merchants, permit-
ade from one port to ano-
ying custom.
heraldry, a bearing in the
square. Some think they
s of stuff, others take them
Guillim fancies that they
er sealed up. *Billete* mean
strewed over with billets
ining the number.
in mathematics. If two
B and B C, commensura-
ver, containing a rational
mpounded, the whole line
rational, and is called a
w.
thmetic, an invention of
e more expeditiously dis-
roperties of numbers and

mensions. Any biquadratic equation may be generated by the multiplication of four simple equations; or by two quadratic equations; or it may be formed by the multiplication of one entire and one simple equation.

BIRCH *tree*, see *Betula*.

BIRD, *avis*, in zoology, one of the six general classes of animals, the characters of which are, that the body is covered with feathers, and they have two wings, two legs, a horny bill, and the females are oviparous. The knowledge of birds is called ornithology; and there are six orders, viz. accipitres, picæ, anseres, grallæ, gallinæ, and passeres.

BIRDS, in heraldry, are the emblems of liberty, expedition, readiness, or fear. Birds which are whole footed or have their feet divided and without talons, are said to be numbered: but all birds of prey with sharp beaks and talons are termed armed. If the wings of birds are not displayed they are said to be borne close.

BIRD-CATCHING, the art of taking birds or wild fowl. The nets used by bird catchers are about twelve yards long and two and a half wide, which are spread on the ground at such a distance that when turned over they may coincide. The remaining apparatus consists of lines so fastened to the nets that the bird-catcher is able to draw the net over the birds that alight between the parallel sides. These birds are enticed by others termed call-birds, which are generally linnets, goldfinches, green-finches, woodlarks, red poles, yellow hammers, tit-larks, and bullfinches. When these perceive the wild birds they begin to sing, and as soon as they are heard the wild birds alight within twenty yards of the bird-catchers, and are easily caught. Birds are also caught in traps, and frequently by nooses of hair. Great numbers of wheatears, woodcocks, and snipes, are taken in this way. Wild days, and skimmed as often as any thing arises. To use it a third part of nut oil or thin grease must be incorporated with it over the fire. Bird-lime is also made from the gluten of wheat, the berries of the misleto-tree and other vegetable substances.

BIRTHWORT, see *Aristolochia*.

BISCUTELLA, *buckler mustard*, or bastard mithridate mustard; a genus of the tetradynamia siliculosa class and order of plants; in the natûral method ranking under the 39th order, siliquosæ. The silicula is flat,compressed, rounded above and below, two-lobed; the leaves of the calyx are gibbous at the base. There are six species natives of Italy, Spain, France, and Germany. The chief of them are, 1. B. apula. 2. B. auriculata. 3. B. didyma.

BISECT, to divide into two parts.

BISERRULA, a genus of the decandria order and diadelphia class of plants; belonging in the natural method to the 32d order papilionaceæ. The legumen is bilocular and flat; the partition contrary. The only species is the B. pelecina, an annual plant with purple flowers; it is a native of the south of Europe.

BISHOP. the first of the ecclesiastical orders. The word means an overseer or superintendant. An archbishop is of the same order, having superior jurisdiction. In England bishops are elected by the dean and chapter by virtue of a license sent to them from the king called a *conge d'elire*, but with it a letter is sent containing the name of the person whom they are to chuse.

BISMUTH, the heaviest of one of the semi-metals, of a reddish or yellow-white colour, and a lamellated texture; moderately hard and brittle, so that it not only breaks to pieces under the stroke of the hammer, but may be beaten to powder. It is more fusible than lead; and is found more commonly in a native state than any other metallic substance. When bismuth is raised to a strong red heat it takes fire and emits a yellow smoke, which collected becomes a powder called yellow oxide of bismuth. When bismuth is dissolved in nitric acid if water is poured into the solution a white powder is precipitated,which was formerly called magistery of bismuth, and now white oxide of bismuth. It is used as a paint under the name of pearl white. The oxides of bismuth are converted into glass, and for that reason bismuth is sometimes used in cupellation instead of lead.

BISON, see *Bos*.

BISSEXTILE, in chronology, a year consisting of three hundred and sixty-six days; being the same with what is called leap-year.

BISTORT, see *Polygonum*.

BISTOURY, in surgery, an instrument for making incisions, of which there are different sorts; some in the form of a lancet, others strait, and fixed in the handle like a knife, others crooked, with a sharp edge on the inside.

BISTRE, among painters, a glossy sort of dry wood pulverised, and made into a kind of cakes with gum water. It is used to wash designs.

BIT, part of a bridle. There are several kinds: the most common is a short rod of iron made rather wider than the horse's mouth, and furnished with a hook or ring at each end, to which the reins are fastened. The snaffle bit has two [illegible] pieces that rest against the lips or sides of the mouth. In the curb bit the mouthpiece has usually an arch in the middle to prevent its resting on the tongue. Bit also denotes the iron part of a piercer, [illegible], and similar instruments. *Bit of a key* is the part containing the wards.

BITS, in ship-building, are two great timbers abaft the manger in the ship's loof to belay the cable to.

BITTERN, in the salt works, is the brine which remains after the salt is concreted; this is ladled off that the salt may be taken out of the pan and afterwards put in [illegible]

BITUMEN, a natural oily matter, of which the species are, 1. Naphtha, which is found on the surface of springs, and sometimes issuing from certain strata. It abounds in Persia; and is as fluid and transparent as water. It catches fire on the approach of flame, and leaves hardly any residuum. 2. Petroleum, which is found in Persia and various countries of Europe. It is not so fluid or transparent as the former. The colour is yellow with a shade of red or green: reddish brown and reddish black. When burnt it yields a soot. By exposing it to the air it becomes like tar. 3. Mineral tar is found in many parts of Asia, America and Europe. It is viscid, and of a black, brownish, or reddish colour. When burnt it emits a disagreeable smell. 4. Mineral pitch and maltha. This substance resembles common pitch. In warm weather it is soft, and is called adhesive mineral pitch; and in cold weather it is brittle, in which state it is called maltha. The colour is black, dark brown, or reddish. It flames with a strong smell, and leaves a quantity of [illegible] ashes. 5. Asphalt is found in many parts of Europe, Asia, and America, particularly in the island of Trinidad. It is of a black or dark brown colour, and brittle. 6. Mineral caoutchouc. This substance was found in a lead mine in Derbyshire in 1786. It is yellowish or of a reddish brown colour and sometimes of a blackish brown. It greatly resembles caoutchouc or Indian rubber. When soft it is elastic, but brittle when hard. It is soluble in oil of olives; and when distilled yields an oil. There is a variety of this substance which when fresh cut resembles fine cork. It contains within it a nucleus of elastic bitumen.

BIVALVES, one of the three general classes of shell fish, whose shells are composed of two pieces joined by a hinge. In the Linnæan system they are divided into mya solen, tellyna, cardium, mactra, donax, venus, spondylus, chama, arca, ostrea, anomia, mytillus, and pinna.

BIVENTER, in anatomy, a muscle of the lower jaw, whose origin is in the incisure under the mastoid process.

BIXA, the roucou or anotto tree, a genus of the monogynia order and polyandria class; belonging to the 37th order, columniferæ. The only species is the bixa orellana, a native of South America. It grows to the height of eight or ten feet, sending out many branches at the top. After the flower is past the germen becomes a [illegible]

alled also Frankfort
the lees of wine,
water, then ground,
es or peach stones.
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off their engravings.
urnt ivory or bones,
e black and reduced
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Turdus.
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l parts of an animal,
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this water is drained off, sand and fresh water are thrown over them; and after they are dry, they are rubbed with cloths. *Blanching* also denotes the operation of covering iron plates with tin.

BLASIA, *leather cup*, a genus of the order of algæ, and the cryptogamia class of plants. Male calyx cylindric, filled with grains; female calyx naked; fruit roundish, immersed in the leaves and many-seeded. The only species is the B. pusilla, which grows on the banks of ditches and rivulets, in gravelly soils. It grows flat on the ground, in a patch composed of numerous, thin, and pellucid leaves. The seeds are very minute.

BLAST, a disease in grain and trees, called likewise a blight: by some supposed to be owing to cold; and by others to the want of a due supply of sap; some attribute it to ascending fumes of the earth, others again to sharp winds and frosts succeeding rain.

BLATTA, a genus of hymenopterous insects, well known in England under the names of cockroaches and black beetles. The blatta most abundant in *England*, came from America or the East. The best method of clearing them is by a tame hedgehog. All the known species of this insect, whether in the larva, pupa, or perfect winged state secrete themselves in the day, and wander about in the night. Naturalists have enumerated no less than 43 species.

BLAZONING, in heraldry, the art of decyphering or explaining coats of arms. In blazoning you must always begin with the field, and next proceed to the charge; and if many things are borne, you must begin with that which lies immediately on the field. Such terms for the colours must be used as are suited to the rank of the bearer, and all superfluous or redundant it without injuring the texture of the cloth, is the art of bleaching. The first menstruum is pot-ash, rendered caustic by the addition of quick lime: but care must be taken not to make the alkali too strong. As the fibres of flax consist of numerous filaments, closely cemented, it requires 10 or 12 boilings to separate the whole of the resin. Each filament after the process retains the impregnation of colouring matter. Formerly it was the custom to immerse the cloth in pure water. This operation was sometimes hastened by a cold ley; the cloth was then rinsed in running water, and spread on the grass. After being thus exposed, the cloth was washed and boiled in a fresh ley, and again spread on the grass, and so on till it became white. It was, however, necessary to wind it through soapy water, not only to render it soft, but to bleach the borders. Lastly it was rendered completely white, by drawing it through whey or diluted sulphuric acid. This process is generally superseded by the application of oxygenated muriatic acid.

The usual practice of preparing the acid is to mix with the oxide of manganese, muriate of soda, or common salt, and sulphuric acid, diluted with water, in the following proportions: for cotton, manganese 30 parts, common salt 80; sulphuric acid 60; water 120. For linen the proportions are: manganese 60; salt 60; sulphuric acid 50; water 50.

The strength of the acid is ascertained by a solution of indigo. Cloth is prepared for immersion in oxygenated water, by soaking in a ley of weak potash, and then rinsing it in water. The oxygenated muriatic acid alone being found to weaken the cloth, and to injure the workmen, various methods were adopted to prevent these effects: the most successful one

must be immersed in
caustic liquor, and pl
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After the cloth has been
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lime, and then exposed
on the grass.

Bleacking of cotton. T
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Bleaching of wool. The
ing of wool is by scourin
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if a greater degree is
had by the action of the
that is by the fumes of b
the vapour of that ac
combined with water.
whiteness the stuffs
twice, after which they
with soap.

Bleaching of silk. Th
giving lustre to silk is
varnish, which is thus
a weak solution of ca
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bleaching with steam.

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Blennius galeria. 3.
. 4. Blennius ocella-
tinus. This is found
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thin bladder on the human
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ed in the form of a plaister
ed to raise blisters.
e blite, or *strawberry spinach*,
e digynia order and monan-
plants, and of the 12th natu-
oraceæ. There are 4 species
pitatum, which is a native of
rtugal. It is an annual plant,
full of a purple juice, but not
Blitum tartaricum, is a native
It grows nearly three feet in
the flowers and fruit are
n those of the capitatum. 3.

Blitum virgatum is a native of France and Italy. It is smaller than either of the preceding. 4. Blitum chenopodiodes is a low plant and a native of Tartary. All these species are propagated by seeds.

BLOCKS, thick pieces of wood some with three, four or five shivers in them, through which the running ropes pass. Both single and double blocks are called by the names of the ropes to which they belong. Double blocks are used when there is occasion for considerable strength. *Block and block*, signifies that two corresponding blocks have met when a tackle or halliard is hauled close. Fish block is hung in a notch at the end of the davit, and serves to haul up the flooks of the anchor. Snatch block is a great block with a single shiver and a notch cut through one of its cheeks for the more readily receiving of any rope, and is commonly fastened to the main mast.

BLOOD, *sanguis*, a red liquor, which circulates through the arteries, veins, and other vessels in animal bodies; serving for the support of life and the nourishment of the several parts.

BLOOM, a mass of iron after it has undergone the first hammering, called bloomary.

BLOW-PIPE, a hollow tube, used by chemists, enamellers, glass-makers, jewellers, &c. It is a wind instrument for the purpose of increasing the heat of a candle or lamp.

BLOWING *of glass*, a method of forming several kinds of works in the glass manufacture: and is done by dipping the point of an iron blow pipe in the melted glass and blowing through it with the mouth. *Blowing of tin* is the melting of the ore after it has been burnt to destroy the mundic.

BLUE, one of the seven original colours into which the rays of light divide themselves when refracted through a glass prism.

BLUEING *of metals*, is done by heating them in the fire till they assume a blue colour: it is practised particularly by gilders who blue their metals before they apply the gold or silver leaf.

BLUNDERBUSS, a short musquet with a wide bore, capable of holding a number of bullets.

BOA, in zoology, a genus of serpents belonging to the order of amphibia: remarkable for the vast size to which many of them arrive, and also for their prodigious strength. There are 19 species, 1. Boa constrictor, is a native of Africa, India and South America, where it chiefly resides in woody and marshy places. This is the largest of all the tribe and so strong as to destroy buffaloes, deer, &c. by twisting round them in such a manner as to crush them to death by continued pressure, after which it covers its prey with a glutinous substance and swallows the whole. The serpent thus gorged becomes torpid and is easily destroyed by the Indians, who feed on the flesh and make garments of the skin. 2. Boa scytale, or spotted boa, resembles the former in size and manners but is generally of a grey colour with black spots. It is a native of South America. 3 Boa cenchris, or ringed boa. This also i *of a large size*, though not equal to th preceding. Its colour is ferruginous with black circles from head to tail. It is a native of South America. 4. Boa enydris, or water boa, is variegated with different shades of grey. 5. Boa orphryas, or brown boa, has the general habit of the constrictor, but is of a dusky colour. 6. Boa canina, is of a beautiful make, about four feet long; the head is large, and resembles that of the dog; the colour of the animal is an elegant green, with white stripes. It is a native of South America. 7. Boa regia, is of a white colour with chesnut variegations, and sometimes of an orange red. 8. Boa phrygia. This is an elegant serpent and in size equals the canina; the ground is white with a cast of yellow brown on the back, having a series of black variegations. 9. Boa hortularia, is of a moderate size, and has its name from its variegations, resembling the form of a parterre in old gardens. The colour is yellowish and brown. 10. Boa murina, is a middle-sized species, about two feet and a half long; the colour is grey or bluish-brown, with round black spots. It feeds on rats, and is a native of South America. 11. Boa crotaline, is a native of Surinam, and is a large species marked on the back with black spots. 12. Boa fasciata, is a native of Bengal. It is of a yellow colour, marked with dark blue transverse bands. The length of the animal is between five and six feet. It is of the poisonous kind. 13. Boa viperina, is also a native of India, and is about a foot and a half long. The colour of a deep brown; and the back marked with a black band, with a narrow yellowish white margin, and black spots along the sides. The bite of this snake is said to produce a slow wasting of the fingers and toes. 14. Boa lineata, is of a dark blue colour, marked by dotted and curved white lines. 15. Boa horatta, measures about fifteen inches in length, the colour is a dark brown, with yellow spots on the back. Its bite is venemous. 16. Boa siamese, is a small species, about two or three feet long; and an inch and a half in circumference: the colour is yellow, with transverse lines of white. 17. Boa contorrix, is about the length of fifteen inches; has a large head: the colour a pale brown with black spots. It is a native of North America, and poisonous. 18. Boa palpebrosa, is of the length of the preceding; the colour a pearly grey above, with dusky or blueish undulations; and breath a pale yellow brown. 19 Boa annulata. This measures about two feet in length; it resembles the hortulana, but the back is marked with black spots. It is a native of South America.

BOARD, a sea-term, signifying to go into the ship. Board and board is when two vessels touch each other. To make a board is to turn to windward. A mast is said to go by the board when it falls over the side. The weather-board is that side which is to windward.

BOAT, a small open vessel, conducted on the water by rowing or sailing. The largest boat belonging to a ship is the long boat, which is generally furnished with a mast and sails. Besides this there are the pinnace, the cutter, jolly boat, skiff, yawl, &c.

BOAT, life, an invention for preserving the lives of shipwrecke
was invented by Mr. Gre
Shields in 1790, and ha
with the happiest effects.
thirty feet in length and
the depth from the top o
the lower part of the keel
three feet three inches;
wale to the platform, two
from the top of the sterns, b
to the horizontal line of th
keel five feet nine inches.
the boat is elliptical; an
cased with layers of cor
butes to the buoyancy of
defends it in going along
The ends of the boat bein
can be rowed either way
twelve men to work her;
on each side rowing doub
each end to steer her.
the wreck if the wind b
shore, the boat requires on

BOCARDO, in logic, the
the third figure of syllogism
middle proposition is an
mative and the other two

BOCCONIA, *greater tre*
genus of the monogynia or
candria class of plants,
method belonging to the
adeæ. The only species
frutescens, which is a na
and the West Indies.
height of twelve feet, and
vered with a white bark.
divides into several branch
leaves are situated alterna
abounds with an acrid juic
inhabitants as a cure for w
the eyes.

BODY, in physics, an
substance of itself passiv
but capable of any sort of
all figures and forms.

BODY, in geometry; the
or those which have all th
sides similar and equal, a
trahedron, octahedron,
icosahedron, and the cube.

BODY, in painting, is a
colours which mix entirely

Descent of bodies. Hea
unresisting medium, fall
form accelerated motion,
spaces descended are in
ratio of the times and ve
crease according to the une
3, 5, &c. The times and
a subduplicate ratio of the
locity of descending bodies
to the times from the begin
and the spaces described b
are the squares of the time
ginning of its descent.

BOEHMERIA, in botany,
monoecia tetandria class an
are five species, natives o
the West Indies.

BOERHAAVIA, a genu
gynia order, and monandria
There are 7 species, all n
Some of them rise 5 or 6
others not above 28 inche
are red.

BOILING, or *ebullition*,
fluids, arising from the act
All fluidity is the effect

the matter of heat, absorbed
n passing from a solid to a fluid
oiling is the act of a body from
e, to that of vapour, by a fur-
ption of the caloric. If the heat is
the bottom of the vessel, after
liquid has acquired a certain
re, those particles next the bot-
e elastic, and ascend as they
through the liquid like air-
nd throw the whole into vio-
on. The liquid is then said to
y liquid has a fixed point, at
ling commences, and this is
boiling point. Thus water be-
when heated to 212 degrees.
uid has begun to boil, it will
e hotter, however much the
e increased.

n mineralogy, a mineral found
Italy, Silesia, and the isle of
It is generally of a dusky yellow
olour, of an earthy texture, and
polish by friction. It has a
and adheres strongly to the
n being put into water it ab-
le and breaks into small frag-
h a crackling noise. It is used
red paint.

S, *spunk*, a genus of the order of
nging to the cryptogamia class of
here are one hundred and se-
es, of which the principal are,
ovinus, or cow spunk, which is
n woods and pastures. Its
own, tawny, red, purple, or
2. Boletus igniarius, or touch-
k, is frequent on old trees parti-
es. It is a hard woody sub-
ous sizes; and is made use
l places as tinder. It has also
l efficacious in stopping the
the vessels after amputation.
hi laricis, or agaric, grows on
es. It is a light spongy sub-
very white. 4. Boletus sube-
ite cork spunk, grows on the
h and willow trees. It is used
r corks.

IN STONE, a kind of mineral
Bologna in Italy, which after
red by calcination, shines in
several minutes like a burn-

iron fastening fixed to doors
; or in the timbers of ships.
wau is the quantity of twenty-

military affairs, a globe or
iron, having a vent to receive
e. The shell being filled with
fuse is fastened with a ce-
tube is filled with a com-
tter, which burns when the
d off, and at last communi-
the gunpowder, the bomb
eat violence.

MENT, the assaulting a for-
by throwing shells into it to
es, magazines, &c. The mor-
g bombs are usually fixed at
of forty-five degrees, by which
hell describes a curve called
projectile; but the elevation
ily vary according to distance
cumstances.

NE, a name given to two kinds
one of silk, and the other
crossed with cotton. That of silk pays duty on importation as other foreign silks. That of cotton pays a duty according to the width of each piece.

BOMBAX, the silk cotton-tree, a genus of the polyandria order, and monodelphia class of plants, in the natural method belonging to the 37th order, columniferæ. The species are: 1. Bombax ceiba, with a prickly stalk. 2. Bombax heptaphyllum, with leaves divided into seven parts. The cotton is of a fine purple colour. 3. Bombax pentandrum, with a smooth stalk. This and the ceiba grow in Africa and the East and West Indies, where they arrive at a great magnitude, and Bosman says he has seen them in Guinea so large that 20,000 armed men might stand under the branches of one. The flowers are purple, and are succeeded by oval fruit, as large as a swan's egg, having a thick cover, which, when ripe, opens in five parts, and is full of a dark short cotton, inclosing seeds like peas. 4. Bombax gossipinum, described by Miller as growing in the gardens at Goodwood, and raised from seeds brought from the East Indies. The cotton of the first and third species is used for stuffing pillows or chairs, and the purple down of the heptaphyllum is made into cloths by the inhabitants of Spanish America. Large canoes are made of the trunks of these trees.

BOMB-KETCH, a vessel furnished with mortars, &c. to cover the landing of troops, and to protect the coasts and harbours.

BOMBIC acid, a yellow liquor found in a reservoir near the anus of the silk-worm.

BOMBYLIUS, a genus of insects belonging to the order of diptera. There are five species; 1. The major, with black wings. This is called the humble-bee-fly. 2. The medius, with a yellowish body, white behind, and the wings spotted with yellow. 3. The minor, with unspotted wings. 4. The ater, with red wings, and green feet. 5. The capensis, with the wings spotted with black, an ash-coloured body and white behind. It is a native of the Cape of Good Hope; the rest of Europe.

BOMBYX, a genus of lepidopterous insects, or a division of the phalæna, an extensive genus, in which all the moth tribes are comprized by Linnæus. They never fly except in the evening, and the greater part of the species lead a solitary life; but some live in societies like other larvæ of the moth tribe; those of the bombyx cast their skin several times. The species are innumerable.

BONA *fides*, in law, is indicated when a person performs an action without disguise or equivocation.

BOND, in law, is a deed whereby a person binds himself, his heirs, &c. to pay a certain sum, or to do a particular act. If the conviction be impossible at the time the bond is made, or if it is to do a thing contrary to law, the obligation is void; as also the bonds of a feme covert and an infant. And if a person in confinement enters into a bond to him who causes his restraint, the same may be avoided. A *post obit bond* is one that becomes payable after the death of a person therein mentioned.

BOND, in carpentry, is the fastening two or more pieces together; and in masonry it is when bricks or stones are so interwoven that the joints are not made over or upon other joints.

BONE, the most solid part of animals The component parts of bones are principally the earthy salts, fat, gelatine, and cartilage. The earthy salts are, 1. Phosphate of lime, which forms the greatest part of the whole. 2. Carbonate of lime. 3. Sulphate of lime, which is the smallest part. The proportions of fat and gelatine are also very considerable. The cartilaginous substance is the portion of the bone first formed: hence the softness of these parts at first. The phosphate is afterwards gradually deposited, and gives the bone the requisite firmness. The gelatine and the fat, particularly the first, give the bone its toughness and strength. The relative proportion of phosphate of lime and cartilage differs very much in different bones and different animals.

BONES, *fossile* or *petrified*, are those found in the earth frequently at great depths in all strata, even in the bodies of stones and rocks. Some of them are of an enormous size, and have been usually supposed to be the bones of giants, but more truly of elephants, hippopotamia, and some quadrupeds now not known.

BONING, in surveying and levelling, is the placing of three or more rods or poles, of the same length, on the ground in such a manner that the eye may see along the tops of them all from one end of the line to the other.

BONNET, in fortification, a small work consisting of two faces having only a parapet with two rows of palisadoes. *Bonnet a pretre* is an outwork having at the head three salient angles, and two inwards. *Bonnet*, in sea language, is an addition to a sail.

BONTIA, the wild olive of Barbadoes, a genus of the angiospermia order and didynamia class, belonging to the fourth order, personatæ. The only species is the Bontia daphnoides, which grows to the height of 10 feet, with narrow, smooth, and thick leaves, and flowers from the sides of the branches, succeeded by large oval fruit.

BOOK, the general name of any considerable literary composition, or that which makes a volume.

The Pentateuch of Moses is the most antient in the world, and in profane literature, the poems of Homer, though the names of others still more antient, are preserved. The materials for making antient books were very different; plates of lead and copper, blocks of wood, the barks of trees, bricks, and tables of stone were first used. Hesiod's works were originally written upon tables of lead; the decalogue delivered to Moses, was written or engraved upon stone; and Solon's laws upon planks of wood. The leaves of the palm tree were afterwards adopted for this purpose, and next the finest part of the bark of trees, whence originates the word *liber*, a book, which signifies the inner bark; and when these barks were rolled up, the whole roll was called *volumen*, a volume; a name afterwards given to similar rolls of paper or parchment. Book also signifies a part or division of a volume;
the first book of Samuel, th
of Moses, &c.

BOOK-BINDING, the art
and forming the sheets of a
volume: The leaves being
order of the signatures, are
stone with a hammer to
smooth, they are then put int
sewed on bands, after whic
are glued, and the bands
scraped for the better fixin
boards; the back is turned w
and the book fixed in a pr
two boards, in order to make
the pasteboard; holes are th
fixing them to the book, whic
a third time. Then the book
cutting press betwixt two
lying even with the press fo
run upon, the other above fo
run against; after which the
are squared. The next ope
sprinkling the leaves, which
dipping a brush in vermili
green, holding the brush in o
spreading the hair with the
covers being moistened are
of the book, then smeared wi
afterwards stretched over the
on the outside, and doubled
having taken off the four an
dented and platted the cover
band: which done the book
and bound between two ban
dry. It is afterwards washe
and water, and then sprin
brush; unless it is to be ma
the spots are made larger by
of vitriol. After this the boo
with the white of an egg, and
ed with a hot iron. The lea
naments are made with gil
brass cylinders rolled along
To apply the gold the leath
with a liquor made of white
luted with water, and whe
the gold leaf is laid on
with tools heated first in a c

BOOK-KEEPING, or me
compts, is the art of recordi
transactions, so that the true
part may be known.

Merchants books are kept
double entry. Those who
the former method, use only
day-book, and a ledger or po
former to record the articles
and the other to draw out th
all debtors and creditors
the journal. This met
proper for traders who h
business: but wholesale
keep their books according
method, or double entry, req
other books, the principal
the waste book, the journal
besides which they have
auxiliary books: The *Wast*
gister containing an invento
chant's effects and debts, wi
cord of his dealings. The
opens with the inventory co
parts; first the effects, that
goods, &c. with the debts du
second part states what is
the difference between whi
fects is called net stock.

After the inventory is sta

are entered as they daily
hould be done in as sim-
sible. The waste book
ooks are kept should not
account of dealings in
omestic expenses, wages,

the book in which the
nded in the waste book
be carried to the ledger,
proper debtors and cre-
them; therefore the de-
vent errors in the ledger.
is filled up, the journal
ork in revising and cor-
st the waste book and
ared, and then the jour-
but to revise the ledger
waste book would be
he journal is intended as
a merchant's business,
omplete than any of the
the journal persons and
ed debtors to other per-
and in this it agrees with
the same style is used,
and orders are different.
examples will shew the
ste book and journal.

OK.—July 1st, 1806.

liam Pope, 40 k cloth, at 14s. able in three		28	0	0
es Sloane, 400 oon, at 10d. per				
-	L.2 0 0			
nonths	2 3 4	4	3	4
ope, 4 pipes at 27l. 10s. per				
rd,	L55 0 0			
and,	55 0 0	110	0	0

AL.—July 1st.

o William Pope, ds. at 14s. per in three months,		28	0	0
to sundries,				
part for 10d. per	2 0 0			
the rest, nths,	2 3 4			
n		4	3	4
to port wine,				
in part 27l. 10s.	55 0 0			
for the nd,	55 0 0	110	0	0

Every case or example of the waste book when entered in the journal is called a journal post or entrance; they in the above make three direct posts. Again a post is single or complex; the first is that which has one debtor and one creditor; a complex post is when one debtor is balanced by one or more creditors, or when two or more debtors are balanced by one creditor, or when several debtors are balanced by several creditors, when the post is said to be complex in both terms.

Of the Ledger. In this the several articles of cash account that lie scattered in the other books, according to their dates are collected and placed together in such a manner that the opposite parts of every account are directly set fronting one another on opposite sides of the same folio.

The folios are divided into spaces, on the head of which are written the titles of the account, marked Dr. on the left hand page, and Cr. on the right; below which stand the articles, with the word *To* prefixed on the Dr. side, and *By* on the Cr. side; and in the margin are recorded the dates of the articles in two small columns. Before the money columns, stands the folio column, which contains the figures directing to the folio, where the corresponding ledger entrance of each article is made, for every thing is twice entered in the ledger, viz. on the Dr. side of one account, and on the Cr. side of some other. Besides these columns there must be kept in all accounts, when number, weight, measure, or distinction of coins is considered, inner columns to insert the quantity; and for the ready finding an account in the ledger, it has an alphabetical index, wherein are written the titles of accounts with the number of the folio where each stands.

Rules for filling the ledger from the journal. 1. See that the Dr. of the journal post is inserted in the index under its proper letter. 2. Having distinguished the Dr. and Cr. sides, complete the entry in one line, carrying the sum to the money columns, and inserting the quantity, if it is an account of goods in the inner columns, and the referring figure in the folio column. 3. Turn to the Cr. of the journal post, and on the margin mark the folios of the accounts with that of Dr. above, and that of Cr. below, and a small line between them thus $\frac{6}{12}$ which marginal numbers are a kind of index to the ledger. 5. In opening the accounts in the ledger, follow the order of the journal, beginning with the first journal post, allow the first space for the Dr., the next for the Cr., the third for the Dr. of the following post and so on till the whole be transported. Example

LEDGER.

Dr.	Fo.	L.	s.	d.			Contra Cr.	Fo.	L.	s.	d.
wine receiv- part for 4 at 27l. 10s. per	6	55	0	0	1806 July	1	By Shalloon, paid in part for 100 yard at 10d. per yard.	12	2	0	0
Pope, Dr. wine, [illegible] per l	6	55	0	0	July	1	Contra Cr. By Black cloth for 40 yards, at 14s. per yard	3	28	0	

Cash-book. This is the most important of the auxiliary books, and is so called because it contains an account of all the cash received and paid, the persons from and to whom, and on what and whose account.

Book of Debts or Payments, is one in which is written the day on which all sums, whether to be received or paid becomes due, including bills of exchange, notes or otherwise.

Besides these, there are other auxiliary books, according to the extent and nature of the concern.

BOOM, on board of ships, is a piece of timber with which the clew of the studding sail is spread out; in brigs and sloops it is the long piece projecting from the mainmast over the stern to which the main sail is attached. Boom also means a cable or chain across the mouth of a harbour, with pieces of timber fastened to it, to prevent an enemy from coming in.

BOOTES, a constellation of the northern hemisphere, consisting of 23 stars according to Ptolemy, 28 to Tycho, 34 to Bayer, 52 to Helvetius, and 45 to Flamstead.

BORACIC *acid,* the principal part of the composition of borax, which is thus procured: Dissolve borax in hot water and filtre the solution; then add sulphuric acid, till the liquid has an acid taste. Lay it aside to cool, and a number of small crystals will be formed, which compose the acid. It reddens vegetable blues, and combines with alkalies, alkaline earths, and alumina, and with most of the metallic oxides, and forms compounds called borats.

BORAGO, in botany, a genus of the pentandria monogynia class and order, the flower of which consists of a single petal of the length of the cup, and divided into five segments: there is no pericarpium, but the cup grows larger and inflated, and contains four roundish seeds. There are five species.

BORASSUS, a genus of plants, of the dioecia hexandria class and order. The male flower is called ampana, and the female carimpana, on account of their different appearance. There is one species, which is a native of Ceylon.

BORAX, a salt resembling crystals of alum brought from the East Indies in an impure state, and afterwards purified.

the coats of arms of persons if
name.

BOREAL *signs,* in astronomy, a
six signs of the zodiac, or those
the equinoctial.

BORER, an instrument made
ascertain the nature of soils.
of two iron rods each about six
and an inch in diameter, which
one another. Hereby two
sound the depth of twelve fe
than a quarter of an hour, if no
by stones.

BORING, is the method of pi
earth in search of minerals,
scooping irons made use of for
pose are drawn back at proper
the samples of earth and mine
they bring up are examined to
ther it is worth while to open
the place.

BOROUGH or BURGH, a
or town which is not a city.
the word meant a company
lies living together: it is now
such places as send member
ment.

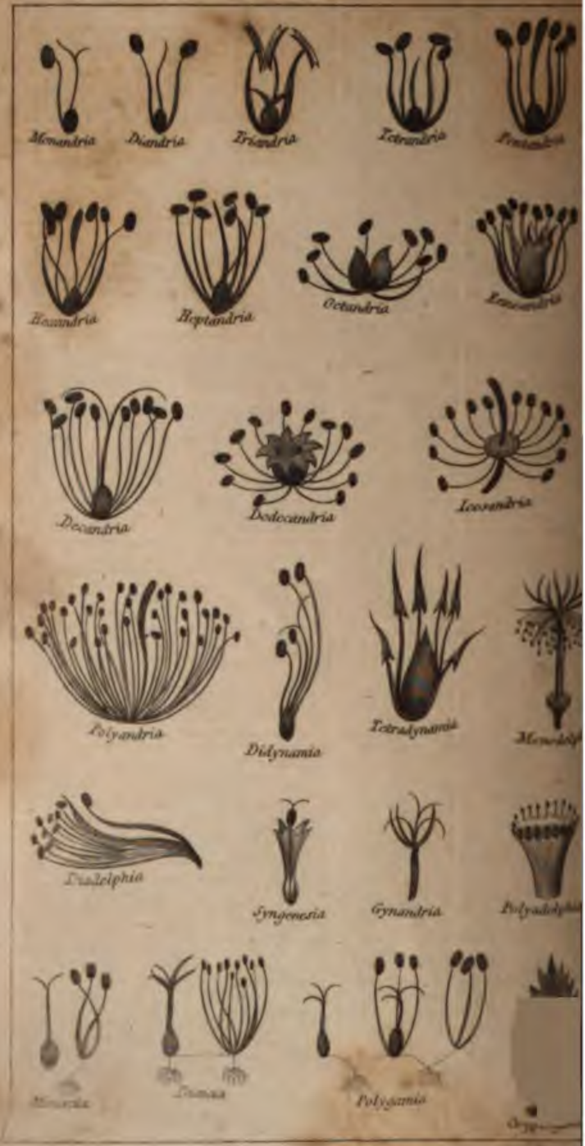
ROYAL BOROUGHS in
certain corporations made for
tage of trade by royal char
have the privilege of sending
parliament and are a body of
appointing commissioners t
convention at Edinburgh to
the general interest.

BOROUGH ENGLISH,
descent of lands or tenemen
places by which they go to
instead of the eldest son
owner dies without issue to
brother.

BOS, in zoology, the ox,
quadrupeds of the order of
species are, 1. The bison,
the several races of comm
derived is found wild in ma
inhabiting woody regions,
to a larger size than any of
kind. It is remarkable also f
shaggy hair, which hangs a
and shoulders and nearl
ground. The colour is da
eyes large and furious. 2. Co
is the bison reduced to a d
and there are as many
the sheep. The British b
cular has been so much
foreign mixtures that it

BOTANY.

Classes.



Published June 1. 18[illegible] by R. Phillips, Bridge Street Blackfriars London

x. it is employed
arious kinds of la-
n drawing heavy
veral varieties, the
which is the naked
[illegible]. It is small,
[illegible] marked on
[illegible].

[illegible], or musk ox,
hair. It is a native
of the size is small.
a dusky red, and
very fine wool, [illegible]
[illegible] than [illegible] warm
The horns, when
[illegible], when sepa-
are said to weigh

[illegible]S, or Yak, is an in-
[illegible] of the height of an
[illegible] is short with two
sharp points. The
e animals as beasts
ur tents and ropes
and jackets of the
used in the east by
us: and the Chinese
ig them as tufts to
s. The Yak is tame-

Cape ox, with large
er parts of Africa
Good Hope. It is
sh ox and is very
It is said to strip off
s which it licks by
ngue. The [illegible]
s wild state.
[illegible] a genus of the
[illegible] class: [illegible]
[illegible] to the [illegible]
[illegible] pentaphyllous,
[illegible]sperm[illegible]us. The
Bosca [illegible]
the Country and Ca-

branches. 2. Culmus a straw or haulm is the proper trunk of grasses. It is either jointed or not; round or angular. 3. Scapus, a stalk, is a herbaceous trunk which is a stalk proceeding immediately from the root and terminated only by the flowers. 4. Stipes, a trunk applied to mushrooms, also to the thread which elevates the down with which some seeds are furnished.

III. The leaves are simple or compound. 1. A simple leaf adheres to the branch singly, or its footstalk terminates by a single expansion. 2. A compound leaf has its footstalk furnished with separate simple expansions, or its divisions extend to the middle rib, called a common petiole, supporting several lobes or little leaves. The manner or place in which leaves are attached to the plant is called their determination.

IV. The [illegible] fulcra, is a term used to express those external parts which strengthen or defend the plants on which they are found; these are, 1. Petiolus or the footstalk of a leaf. 2. Pedunculus the footstalk of a flower. 3. Stipula, [illegible] or husk, a small leaf on most plants on each side the base of the footstalk to support the leaves and flowers. 4. Cirrhus, a clasper or tendril, is the fibre by which plants fasten to something for support. 5. Pubes, the hair, down, bristles, and other appearances on different parts of plants. 6. Arma, the defensive weapons as prickles, &c. 7. Bracteæ, the floral leaves, are those nearest the lowest parts of the flower, and sometimes those which terminate the flower-stalk.

V. The fructification consists of the calyx, corolla, stamina, pistillum, pericarpium, semina, and receptaculum.

VI. [illegible] manner by which flowers are [illegible] peduncles.

[illegible]

by Linnæus a receptacle, is when several fastigiate peduncles proceed from a common centre. 5. Amentaceous aggregate are those flowers which have a common receptacle with scales forming an amentum or catkin. 6. Glumose aggregate are such flowers as proceed from a common husky calyx, belonging to grasses called gluma. 7. Spadiceous aggregate are flowers which have a common receptacle protruded from a common calyx. There are several other modes of flowering that come under this term of inflorescence, as, 1. Verticillus, when the flowers are placed in whorls at each joint round the common stalk. 2. Capitulum, a little head, is when many flowers are connected in a globular form on the common stalk. 3. Spica, a spike, is when the flowers having no partial peduncles, are placed round a simple peduncle. 4. Corymbus, a cluster of ivy berries, when the lesser peduncles of the flowers proceed from the different parts of the common peduncle. 5. Thyrsus, a young stalk, a mode of flowers resembling the cone of a pine. 6. Panicula, the tuft upon seeds is when the flowers are dispersed upon peduncles variously subdivided. 7. Axillares are those flowers which proceed from the angle formed by the leaf and the stem. 8. Terminales, are flowers which terminate the stalk or branch. Luxuriant or double flowers are only varieties: of which there are three degrees, viz. 1. Multiplicatus, when the petals are so multiplied as to exclude part of the stamina. 2. Flos plenus, when the corolla is so multiplied as to exclude all the stamina. 3. Flos prolifer, when one flower grows out of another. 4. Flos mutilatus, is a flower deprived of all or the greatest part of the petals, and yet bears seeds.

A *bulb* is a longer kind
duced under ground, and p
caudex of certain plants.
called bulbous. Bulbs are
consisting of scales, lying ov
2. Solid, or of a close s
Coated, consisting of ma
Cauline, produced not o
sides of the principal bul
other parts of the stem. A
the embryo of the plant, se
stem of the branches, covere

Sect. 11. *Of the classes of th*
are distinguished into mal
maphrodrite, and neuter.
are those which have only
as in the classes, monoecia,
polygamia. Females are
only the pistilla, as in the
Hermaphrodites are thos
the stamina and pistilla
flower, as in almost all the
hermaphrodites are likewi
ed into males when the
fectual, and female hermap
the male is ineffectual. N
are those which have neithe
pistilla perfect.

Plants are denominated
of their flowers. Andro
are those which bear mal
flowers on the same root,
monoecia. Polygamous pl
which bear hermaphrodite
male or female flowers,
tinct on the same or differen

Table of the Clas

1. Monandria, one male
an hermaphrodite flower.
two stamina. 3. Triandr
Tetrandria, four. 5. Pentan
Hexandria, six. 7. Hepta
8. Octandria, eight. 9. Enn

of the same species. 32.
ale, female, and hermaphro-
in the same or different
Cryptogamia, the flowers in-
al they cannot be ranked
the parts of fructification.
f the orders of plants. The
ior divisions. In the first
are taken from the female
ame manner as the classes
ly and named monogynia,
ia, &c. *i. e.* one, two, three,
When the pistils have no
s like the stamina, they are
the stigmata or tops of the
14th class the orders are
ymnospermia, comprehend-
which have naked seeds;
mia, or those which have
vered or inclosed in a cap-
h class is divided into two
e siliculosa or those which
od, and the siliquosa, or
ve a longer one.
f the 16th, 17th, 18th, and
e taken from the number of
as monadelphia pentandria,
rs of the 19th class are, 1.
ualis, whose floscules have
pistils. Polygamia spuria
plants that have hermaphro-
n the disk, and female ones
which make the basis of the
ers, viz. 2. Polygamia su-
hermaphrodite flowers in the

disk are furnished with stigmata and bear seed, and whose female flowers in the radius likewise produce seeds. 3. Polygamia frustranea, such as have hermaphrodite bearing floscules in the disk; but those in the radius are barren as wanting stigmata. 4. Polygamia necessaria, are those whose hermaphrodite flowers in the disk are barren; but the female floscules in the radius have stigmata and produce seeds. 5. Polygamia segregata, many floscules in a common calyx, each of which has a distinct perianthium. 6. Monogynia. This order consists only of eight genera, none of which have properly compound flowers, but are ranked under this class from having their stamina united by the antheræ. The orders of the 21st class are partly taken from the number of stamina and partly from the names and character peculiar to some of the other classes, as monoecia triandria, monoecia syngenesia, &c. The orders of the 22d class are founded on the number, union, and situation of the stamina in the male flowers. Those of the 23d are taken from classical characters. The 24th class is divided into four orders, 1. Filices, comprehending all plants that bear their seeds in the back, or edges of the leaf, and those called capillary plants. 2. Musci, or the moss kind. 3. Algæ, including the lichens, fuci, and others, whose parts of fructification are obscure. 4. Fungi, comprehending all the mushroom tribes.

TABLE OF THE ORDERS.

Number and Names of the Orders.

2. Monogynia, Digynia.
3. Monogynia, Digynia, Trigynia.
3. Monogynia, Digynia, Trigynia.
3. Monogynia, Digynia, Tetragynia.
6. Monogynia, Digynia, Trigimia, Tetragynia, Pentagynia, Polygynia.
5. Monogynia, Digynia, Trigynia, Tetragynia, Polygynia.
4. Monogynia, Digynia, Tetragynia, Heptagynia.
4. Monogynia, Digynia, Trigynia, Tetragynia.
3. Monogynia, Trigynia, Hexagynia.
5. Monogynia, Digynia, Trigynia, Pentagynia, Decagynia.
ia. 5. Monogynia, Digynia, Trigynia, Pentagynia, Dodecagynia.
8. Monogynia, Digynia, Trigynia, Pentagynia, Polygynia.
7. Monogynia, Digynia, Trigynia, Tetragynia, Pentagynia, Hexagynia, Polyginia.
2. Gymnospermia, Angiospermia.
nia. 2. Siliculosa, Siliquosa.
nia. 8. Triandria, Pentandria, Octandria, Enneandria, Decandria, Endecandria, Dodecandria, Polyandria.
4. Pentandria, Hexandria, Octandria, Decandria.
ia. 4. Pentandria, Dodecandria, Icosandria, Polyandria.
6. Polygamia æqualis, Polygamia superflua, Polygamia frustrania, Polygamia necessaria, Polygamia segregata, Monogania.
10. Diandria, Triandria, Tetandria, Pentandria, Hexandria, Octandria, Decandria, Dodecandria, Polyandria.
11. Monandria, Diandria, Triandria, Tetrandria, Pentandria, Hexandria, Heptandria, Polyandria, Monadelphia, Syngenesia, Gynandria.
15. Monandria, Diandria, Triandria, Tetrandria, Pentandria, Hexandria, Octandria, Enneandria, Decandria, Dodecandria, Icosandria, Polyandria, Monadelphia, Syngenesia, Gynandria.
3. Monoecia, Dioecia, Trioecia.
nia. 4. Filices, Musci, Algæ, Fungi.
1. Palmæ.

These last which consist of trees and shrubs may be all arranged in the preceding classes of the system. They have always a simple stem not branched, bearing leaves at the top.

Sect. IV. *The genera of plants.* The essence of every vegetable consists in the fructification in the flower and fruit; that of the flower in the antheræ and stigma, and of the fruit in the seed. Hence Linnæus makes the flower and fruit the basis of his generic distinctions. These are composed of seven parts; the corolla, the stamina, the pistillum, the pericarpium, the semina, and the receptaculum, and the presence or absence, the number, figure, proportion and situation of the several parts, constitute the genus. The first four are properly parts of the flower, and the last of the fruit

I. The calyx or cup, is the termination of the outer bark of a plant. When present it is seated on the receptacle; and is distinguished by its figure; by the number, division, and shape of its leaves, or segments; and by the following names according to circumstances. 1. When its situation is close to and surrounds the other parts of the fructification it is called the perianthium of the fructification: if it includes many floscules it is called a common perianthium; if only one floscule, a proper perianthium; if it includes the stamina, and not the germen, it is the perianthium of the flower, and is said to be above; but if it includes the germen and not the stamina it is said to be below. 2. The involucrum is termed universal or partial according to its situation under the umbel. 3. Amentum, consists of chaffy

Receptaculaceous nectaria
the receptacle. 6. Nectaria
the corolla, are placed in a
the petals, though uncon
their substance. 7. Nectaria
construction, are those
properly be placed under
above distinctions, as in
cuva, urtica, &c.

III. The stamina, or
males of the flower, proceeding
wood of the plant. Each
two parts, viz. The filame
antheræ. 1. The filament
shaped part of the stamen,
footstalk to elevate the anthe
sometimes two, three, and
2. The antheræ or flower
the filament, containing the
pollen, and is one to each
one common to three or
times there are two, three,
theræ to each filament, or
filaments. The anthera is
by its form or figure. It co
or more cells, and is fasten
ment by its base, or
middle; or fixed by its
the top of the filament, the
cumbent. Sometimes it gr
nectarium, to the receptacle,
pistillum.

IV. The pistillum is the fe
flower, and proceeds from the
plant. It is the column wh
rises in the centre of the flowe
stamina, and consists of thre
germen, style, and stigma.
is the base of the pistillum,
the style, and afterwards

valve, including
The berry is called
true pericarpium
and improper when
ts of the fructifica-
ound or oval, and
with an umbilicus.
rpium formed of an
d vessel composed
ced against each
cone, opening at
d fixed below to a
the middle of the

ds are the essence
distinguished ac-
hape, texture, ap
d consists of five
lded the nux and
ulum, or the heart,
of the future plant,
the plumula and
ledons are the side
first leaves of the
lum, or the black
the eye, is the
ere it was fasten-
n. 4. The arillus,
seed, which falls
is cartilaginous or
mula is a small ca-
of the seed, or a
valerian, &c. or
c. Nux, a nut, is a
ll. [illegible]

[illegible]

f plants. The [illegible]
[illegible] the [illegible]
[illegible]

[illegible]

[illegible] as the saffron,

iris, &c. 7. Orchideæ, the orchis kind. 8. Scitamineæ are exotics and natives of warm climates, as the amomum, the musa, &c. 9. Spathaceæ are allied to the liliaceous plants, from which they are distinguished by the spatha. 10. Coronariæ are herbaceous and perennial plants. The roots are bulbous, fibrous, or composed of fleshy knots, jointed at top. The hyacinths and lilies belong to this class. 11. Sarmentosæ from sarmentum, a long shoot, these plants have climbing stems and branches. 12. Holeraceæ, from holus, a pot herb, contains trees, shrubs, perennial and annual herbs, as rhubarb, the beet, &c. 13. Succulentæ. This order consists of flat, juicy plants, mostly evergreens. 14. Gruinales, crane-like, consisting of geranium and a few other genera. 15. Inundatæ, are aquatic plants, low, herbaceous, and mostly perennial. 16. Calycifloræ have the stamina inserted into the calyx, and are all of the shrub or tree kind, as the wild olive, &c. 17. Calycanthemæ have the corolla and stamina inserted in the calyx, as the epilobium, lythrum, willow herbs, &c. 18. Bicornes, plants whose antheræ have the appearance of two horns. 19. Hesperideæ, are of the shrub and tree kind, and mostly evergreen, as the myrtle, clove, &c. 20. Rotaceæ, consists of plants with one wheel-shaped petal, without a tube 21. Precia[illegible] are early plants, as the primrose, &c. [illegible] [illegible] [illegible]

[illegible] Verticillatæ, [illegible] vegetables having four naked seeds, the flowers placed in whorls round the stalk, &c. 43. Dumosæ, are of the tree and shrub kind, thick and bushy, such as the elder, &c. 44. Sepiariæ, from sepes, a hedge, derive their name from their use, as ash, privet, &c. 45. Umbellatæ, are plants whose flowers grow in umbels with five petals and two naked seeds. 46. Hederaceæ, are herbaceous and shrubby plants most of which have creeping branches 47. Stellatæ, from stella, a star, consist of plants with two naked seeds, and leaves disposed round the stem in a radiant form. 48. Aggregatæ, plants which have flowers consisting of a number of florets, each having a proper and common calyx. 49. Compositæ, are plants with compound flowers, as carduus, xeranthemum, &c. 50. Amentaceæ, plants bearing catkins. 51. Coniferæ, plants whose female flowers are formed into a cone; as the pine, &c. 52. Coadunatæ plants, whose seed vessels are numerous, and being slightly attached below, form a single fruit in the shape of a sphere or cone; as the tulip tree, &c. 53. Scabridæ, are plants with rough leaves, as hemp, fig, &c. 54. Miscellaneæ. Miscellaneous plants. This order consists of such genera as are not connected together by numerous relations. 55. Filices, ferns, bear their flower and fruit on the back of the leaf or stalk. 56. Musci, mosses, frequently creep, and extend upon the ground, trees, and stones 57. Algæ, flags, or sea-weeds, consist of marine plants, whose root, leaf, and stem are one. 58. Fungi, mushrooms, are rarely branched, sometimes creeping, but mostly erect. Some of them are poisonous.

castle. That part on the right ha
stem to a person looking forwa
the starboard bow; and that on
larboard.

BOW, *weather*, is that part
towards the wind when the s
hauled; the other part is call
bow. *On the bow*, is an expressi
ing that an object appears in th
of a particular part of the bow.

BOWER, in marine language,
of an anchor carried at the bo
ship. There are two of these
best and small bower.

BOWLINE, a rope fastened
middle of the leech or perpendi
of the principal square sails, a
forwards to the bow. Its use
the sails stand close, or by a wi

BOWSPRIT, a kind of mast,
a slope on the head of the ma
tened to the partners of the fo
farther supported by the foresta
ries the spritsail and jack staff.

BOX *tree*, see *Buxus*.

BOYAU, in fortification, a d
with a parapet, serving as a c
tion between two trenches.

BRABEJUM, the *African* a
nus of the monoecia order an
class of plants. Male corolla
parted; stamina four inser
throat; style bifid and abort
maphrodite has a four-part
revolute upwards with four s
pistil with two stigmas. The
dish drupa, with a globular
only species is the Brabeju
lium, which is a native of t
Good Hope. With us it is a
plant, and may be propagat

, is a native of India, emoles the bear. It is tured, feeding chiefly

io, are ropes made use courses and the mizen

nomy.
ks of corn, especially arated from the corn by r. Starch is made of dyers use it for souring their dyes.

gills, in fishes are the spond to the lungs of which they take in and y of water impregnated es except the cetaceous have these organs of are eight in number. he throat.

of *foramina*, the aper- In most fishes there is ; but in the cartilag- e ten, and in the lam etaceous fishes have no they are furnished with

GI, one of the five ge- ses into which they were the rays of the fins are have no bones in the

irit distilled from wine s. It is prepared in e countries of Europe e south of France. In he strong heavy wines best; and it is expected for this purpose should their quantity of spirit. clearly on the different [illegible] arise chiefly [illegible] sugar, sandy atters. Brandy may be [illegible]

tween the shorter stems and pistil, and between the longer ones. There are sixteen species, viz. 1. Brassica orientalis, perfoliate cabbage. 2. Brassica Austriaca, Austrian cabbage. 3. Brassica campestris, yellow field cabbage. 4. Brassica arvensis, purple field cabbage. 5. Brassica alpina, Alpine cabbage. 6. Brassica napus, wild cabbage, rape, or navew. 7. Brassica rapa, turnep. 8. Brassica, oleracea, common cabbage. 9. Brassica chinensis, Chinese cabbage. 10. Brassica violacea. 11. Brassica polymorpha. 12. Brassica erucastrum, wild rocket. 13. Brassica vesicaria. 14. Brassica muralis, wall rocket. 15. Brassica Richeri.

The three first species are very liable to be confounded. The sixth is much cultivated in some parts of England under the name of rape or cole-seed, from whence the rape-oil is drawn. The seventh or the turnep has many variations, as the round, red, or purple topped; the green topped; the yellow; the black-rooted, and the early Dutch. This root has been highly cultivated and improved in different parts of England particularly Norfolk. The red-rooted turnep was formerly much esteemed, but the green-topped has almost entirely superseded it, because the roots grow to a larger size and last longer. The next in goodness is the red or purple topped turnep. The early Dutch turnep is chiefly sown in spring or [illegible]. The cabbage as it is found in its wild state on the sea coast has the stem waved [illegible] indented; and the flowers are large. Early in spring the sea-cabbage is preferable to the cultivated kinds. All the varieties of garden cabbage originate from this. These varieties consist of the coleworts, borecoles, turnip cabbage, white, red and savoy cabbages, the cauliflower, and the brocoli. Some of these again have their varieties with distinct names among gardeners, as the early York [illegible] mines of the besiegers in order to make an attack upon the place.—In law, *breach* is where a person breaks through the condition of a covenant or agreement.

BREAK, in the art of war, is to open the trenches before a place.

BREAKERS, those billows which break violently over rocks lying just under the surface of the sea.

BREECHINGS, the ropes with which the great guns are fastened to the ship's side.

BREEZE, in general denotes a brisk wind. In some climates it is applied to a shifting wind which blows from sea on land for some certain hours in the day or night.

BRENTUS, a genus of coleopterous insects, having the head protracted into a long projecting snout beyond which the antennæ which are moniliform are inserted. There are several species as the anchorago, barbicornis, &c.

BREST-SUMMERS, in building, are pieces into which the girders are framed; in the ground floor it is called a cell; in the garret a beam.

BREAST, in architecture, the member of a column properly termed a torrus.

BREVE, in law, a writ whereby a person is summoned to answer in the king's courts, &c. *Breve perquirere* is the purchasing a writ or licence for trial in the king's courts.

BREVE, in music, a note or character of time of a square form and equal to two minims.

BREVIER, in printing, a small kind of type or letter between nonpareil and bourgeois.

BREWING, the art of making beer or ale. There are several kinds of malt distinguished by the colour which arises from the mode of malting and drying. Before either be used it must be ground or bruised between rollers. The soft water is preferable to hard for mashing and fermentation, though not for transparency. The first step in brewing is mashing, which is done in a tub furnished with a false bottom pierced with holes, and moveable or fixed a few inches above the real bottom. There are two side openings between the two; to one is fixed a pipe to convey water into the tun and the other for drawing the liquor out of it. The malt is to be strewed over the false bottom and a proper quantity of water let in from the upper copper. After which the mass is beaten by poles. When the mashing is completed the tun is covered to prevent the escape of the heat, and the whole is suffered to stand that the insoluble parts may separate from the liquor: the side-hole is then opened and the clear wort discharged into the lower copper. The chief thing in mashing is its temperature, which depends on the heat of the water and the state of the malt. The most eligible temperature is from 185d. to 190d.; but for the first mashing the heat of the water must be less, and so in proportion to the dark colour of the malt: for the pale sort the water may be 180d. but for brown 170d. The wort of the first mashing is always the richest in saccharine matter, but to exhaust the malt a 2d and 3d mashing will be requisite, in which the water may be raised to 190d. or more. The proportion of wort to be had from a
bushel of malt depends on
strength of the liquor; but
of good table beer may be
a bushel. We now come
and hopping; and if only o
quor is to be made, the p
three mashings is to be mix
ale and table beer are requi
the first or first and second m
the ale, and the remainder
The wort intended for the
after it comes from the tun i
lower copper and mixed wi
tion of hops, and the better
more hops will be wanted.
milies the proportion is a po
a bushel of malt; but in pub
the quantity is smaller. W
and table-beer are required,
put the hops into the ale wor
been boiled therein to transfe
the beer wort and again boi

When the hops are mixed
in the copper, the liquor is m
fast as possible; after which
ed into shallow tubs called c
it remains till it is cool enou
fermentation. From the coo
is transferred to the working
it is mixed a gallon of yeast to
beer. In four or five hours the
begins and it requires from
before the wort is fit to be ba
fermentation still goes on
and in a few days a copious
yeast takes place from the bu
being taken to fill up the ba
with fresh liquor: this dis
daily and entirely ends in a
when the bunghole is closed
kept for use.

BREYNIA, in botany, a ge
lyandria dioecia class and or
Essential character: male caly
five parted: corolla none:
glands; filaments five, very
roundish. Female calyx a
in the male. Pistill ger
style none; stigmas five:
capsule five celled, seeds
only species is a native of Ne

BRICK, earth formed into
by a wooden mould and the
kiln or burnt in the sun. T
are compass bricks of a circ
in steyning of walls; conc
bricks used for conveyance
ther edged, which are th
penning up brick pannels in
ings; cogging bricks are us
the indented works under
walls built with great bricks;
are for coping of walls; Dut
bricks for paving yards,
vaults, &c. clinkers are
by the heat of fire; sandal or
are those which are no
burnt but soft and useless;
are for fence walls; plast
bricks have a notch at one
use is to bind the work
bricks. Statute or small co
ought to be nine inches, fo
two and a half thick. Bricks
of pure clay, or of clay mi
or ashes. The clay is first t
water to render it fit for m
brickmakers are called a ga

arings to break the
lo preserve the neva-
the current is some-
ing it more when large;
pped with rows of
s to break the force
be of few and large
maller ones, in or ler
sage for navigation.
arches some prefer
s the elliptical form,
ian; but that of semi-
perfect one, being
y part. The Romans
r bridges, particular-
in over the Danube
ile in length. But
ork of this kind is the
na, built from one
consisting of a single
nd 500 high.
on the old Gothic
feet long, 60 high,
first built of timber
r undergoing many
of stone in 1755.
s 1220 feet long and
n in 1738 and ended
of 389,500£. Black-
an in 1760 and com-
three quarters at an
It is 995 feet long,
he first iron bridge
le was erected over
Colebrook dale in
t consists of five ribs
hree concentric arcs
ng pieces. The inte-
icircle one hundred
n. Since that there
ers erected particu-
mouth near Sunder-

BRINING *of grain*, is the common [illegible] to prevent the smut [illegible] it [illegible]. To [illegible] of wheat [illegible] recommended [illegible] the seed [illegible] of arsenic. The brining of hay is the sprinkling of salt with it while stacking to preserve it. This practice generally prevails in America.

BRIZA, *quaking grass*, a genus of the digynia order and triandria class of plants; ranking in the natural method under the 4th order gramina. Calyx two valved and multiflorous: spicula, bifarious, and small valves, heart-shaped and blunt. There are six species, two of which are natives of Britain, viz. 1. Briza media, the middle quaking grass. 2. Briza minor, the small quaking grass. Both grow in pasture lands. The Briza maxima a native of the south of Europe is an ornamental plant in gardens.

BROCADE, a stuff of gold, silver, or silk raised with flowers, and other ornaments.

BROKER, a term applied to persons of different professions. Exchange brokers are agents who conclude bargains between merchants. These are obliged to be licenced in London by the Lord Mayor. *Stock Brokers* are employed to buy and sell shares in the public funds. *Pawn Brokers* are persons who let out money upon pledges on interest.

BROMELIA, the pine apple, a genus of the monogynia order and hexandria class of plants, in the natural method ranking under the 10th order coronariae. Calyx trifid, superior: corolla with nectareous scales at the base of each berry, three celled. There are nine species: the principal of which are, 1. Bromelia ananas with leaf just below it, longer than the spike. The flowers are placed very close on the spikes, and when they decay the empalement turns to an oval-pointed seed-vessel, inclosing seeds of the same shape with the other. The plants of the pine apple are propagated by planting the crowns which grow on the fruit, or the suckers from the sides under the fruit.

BROMUS, *broom grass*, a genus of the digynia order and triandria class of plants; and of the 4th order, gramina. There are 25 species.

BRONCHOCELE, in surgery, a tumour in the neck, called the Derbyshire wry neck, the inhabitants of that county being much subject to it; as also are the inhabitants of the Alps.

BRONCHOTOMY, in surgery, an incision made in the windpipe, to prevent suffocation.

BRONCHUS, in anatomy, the lower part of the aspera arteria, dividing in bronchiæ or branches.

BRONZE, a compound metal, made from six to twelve parts of tin, and one hundred parts of copper. It is used for cannon and for medals.

BRONZES, a name given to figures and to all pieces of sculpture made of bronze. The method of casting bronzes is this: the figure must have a mould made thereon with a mixture of one part of plaister of Paris, and two of brick dust. In the joists channels are to be cut tending upwards to give vent to the air. When the mould is made a layer of clay should be spread over the inside as thick as the intended bronze: then the mould must be closed and the hollow within the layer filled with two-thirds of brick-dust, and one of plaister mixed with water. This is the core; but if the figure be large, bars of iron must be laid in the mould to support it; and round the same the core must be cast; which being done, the mould must be opened and the clay taken out. The core must then be laid in the mould and supported by short bars of bronze, after which the liquid metal must be conducted in by a sloping channel from the furnace, which is of the same form as used in bell foundries.

BRONZING, the art of varnishing wood, &c. so as to give it the colour of bronze. There are two compositions for this purpose; the yellow and red. The first is made of fine copper dust, and for the latter there is added to it some red ochre well pulverized. Both are applied with varnish, and the work dried over a chafing dish.

BROOM, in botany, see *Spartium* and *Genista*.

BROSEA, a genus of plants of the order monogynia and pentandria class of plants. There is only one species, which is a native of South America.

BROWALLIA, a genus of the angiospermia order, and didynamia class of plants, of which there are two species: 1. Browallia demissa, with a single flower, on each footstalk. It is a native of South America. 2. Browallia elata, with one or many flowers on each footstalk. It is a native of Peru.

BROWN, a dusky colour inclining to red, but of different shades. Spanish
brown is a dark earth, and
painters as the priming co
used to shade vermilion, a
dark ground behind a pict
when burnt red hot. T
dying browns is to put the
ing bath of red wood gro
galls bruised, with an ad
peras.

BRUCEA, a genus of the
der, and dioecia class of pl
only one species, which
Abyssinia.

BRUCHUS, a genus of
insects, with filiform antenn
form feelers, and an
There are twenty-five spec

BRUISER, a brass conc
grinding and polishing the
lescopes. It is tinned on th
and made equally broad at
tom.

BRUNSFELIA, a genus
nia order and pentandria cl
There are two species; th
the Brunsfelia Americana,
or eight feet high, having a
ing stem, with long leaves
and large white flowers,
saffron coloured soft fruit.

BRUNIA, a genus of th
order, and pentandria cl
of which there are eight sp
of the Cape of Good Hope.

BRUNONIAN *system* of
name given to the theory
adopted by the late Dr. J
Edinburgh, founded on wh
excitability of living matt
powers of excitement or sti
these latter the principal w
rits, and opium.

BRUNSWICK *green*, a c
paper hangings and other
painting in water colours,
parts of muriate of ammon
moniac, and two of copper

BRUSH, a domestic
wooden part is generally
and drilled with holes. Wh
are sorted, a portion of the
ther in the middle with a
and in this state fastened in
stock with glue or pitch. T
hair are then cut off, and th
even. Common hearth
brooms are made in a slight
the stock is brought to its sh
ed, the hairs are doubled, a
dle is put into the hole, wi
pitch and rosin.

BRYGMUS, in medicine,
made by the gnashing of th
lepsy and convulsive disord

BRYONIA, a genus of
order, and monoecia class
of the natural order cucur
calyx five toothed, with
corolla, and three filame
calyx dentated, corolla q
trifid, with a roundish ma
ry. There are 19 species,
of which are: 1. Bryo
African tuberous-rooted b
onia alba, rough or white
red flowers, a native of dry
hedges in many parts of
roots of this plant have

ei. and belonging to
ass o plants An-
r covere: with a lid,
nd a filament rising
ubercule. There are
atives of England.
. a swelling of any of
s, but generally found
usually dispersed by
mercurial ointment
nian parsley, a genus
, and pentandria class
the natural method
th order, umbellatæ.
sinuated, and villous.
, which are propagated
Bubon Galbanum, or
Bubon Gummiferum.
he shops, is supposed
two species. 3. Bu-
l. 4. Bubon rigidius,
, is a native of Sicily.
n.
in surgery, is the same
nd scrotala hernia.
enus of the polyadel-
class and order of
e-leaved; petals five-
anthers on each fila-
gma simple; capsule
a five-rayed star. It
West Indies, and is a
ng the elm.
see *Anatomy*.
: *trumpet shell*, a genus
resembling a horn or
nent. There are many
ipal of which are the
le-shell, the mitre, Mi-
t Triton, the tower of
nimal is a snail and ovi-

bet, in ornithology, a ge-
order, distinguished by
p-edged, compressed on
are notched near the

same figure. This bird is also called the Indian raven, the horned crow, and horned pie. 4. Picornis or Philippine hornbill, is of the size of a Turkey hen, and has a bill nine inches long, and two inches in length, on which is a horny excrescence six inches in length, and three inches in breadth.

BUCHNERA, in botany, a genus of the angiospermia order and didynamia class of plants, ranking under the 40th order, personatæ. Calyx obscurely five-toothed; corolla border, five cleft, equal; lobes cordate; capsule two-celled. There are 11 species, natives of Africa and South America.

BUCIDA, in botany, a genus of the order monogynia, and decandria class of plants; of the natural order holoraceæ. Calyx indented in five segments; corolla, none; fruit a single-seeded berry. There is only one species.

BUCKLER, a defensive piece of armour, worn on the left arm, generally made of leather strengthened with plates of iron or brass.

BUCKRAM, a kind of coarse stiff cloth, made of hemp, gummed, calendered, and dryed.

BUCKTHORN, see *Rhamnus*.

BUCKWHEAT, see *Polygonum*.

BUDDING, in gardening, the same as grafting.

BUDDLEIA, a genus of the monogynia order and tetrandria class of plants. Calyx and corolla quadrifid; and the stamina at the incisures of the corolla. Capsule bisulcated, bilocular, and polyspermous. There are eight species, the principal of which are, 1. Buddleia Americana, a native of the West Indies. It is a shrub, which grows ten or twelve feet high. 2. Buddleia occidentalis, a native of Carthagena. This grows to a greater height than the former, and has numerous branches. 3. Buddleia globosa is a native of Chili. It [illegible] genus of the monogynia order, and hexandria class of plants, in the natural method ranking under the 9th order, spathaceæ. Corolla funnel-shaped, and hexapetalous, with the heels narrow, supporting the stamina. The only species is the Bulbocodium vernum, which is a native of Spain, and has a bulbous root. The leaves are spear-shaped, and the flowers of a pale colour, which change to a faint purple.

BULIMY, a disease in which the patient has an insatiable desire for eating. It is also termed *fames canina*, a canine appetite.

BULKHEADS, partitions made of boards across a ship, to divide one part from another.

BULL, see *Bos*.

BULL, an edict or letter of the pope, either of justice or of grace. In the former case, the seal, which is of lead, is appended to the instrument by a cord of hemp, but in the latter by a thread of silk: *Bull in Cœna domini*, is a bull read at Rome, every Maunday Thursday, excommunicating all hereticks, and those who oppose the papal jurisdiction.

Golden Bull, was an edict or imperial constitution made by the emperor Charles IV. and considered as the fundamental of the German empire.

BULL's EYE, a small dark cloud, ruddy in the middle, which sometimes appears at sea, and denotes an approaching storm. This term is also applied to a small oval block of hard wood, without sheaves, having a grove round the outside, and a hole in the middle.

BULLA, a genus of shells whose character is thus defined: animal a limax; shell univalve, convoluted, and unarmed; aperture straight, oblong, longitudinal, and entire at the base; pillar lip, oblique and smooth. There are several species.

BULLION, gold or silver in bars, or in an uncoined state. The value of bullion cannot be determined without its being assayed, that the exact quantity of pure metal contained in it may be found.

BUMALDA, a genus of the digynia order and pentandria class of plants. Corolla five petalled; styles villose; capsule two-celled, two beaked. There is only one species which is a native of Japan.

BUMELIA, in botany, a genus of the class and order pentandria monogynia. Corolla five-cleft, with five-leaved nectary, drupa one-seeded. There are seven species, all trees and shrubs, which are natives of the West Indies.

BUNIAS, in botany, a genus of the order siliquosa, and tetradynamia class of plants, in the natural method ranking under the 39th order, siliquosæ. The siliqua is deciduous, four-sided, and truncated. There are nine species all annuals.

BUNIUM, *pig nut* or *earth nut*, a genus of the digynia order and pentandria class of plants, ranking in the natural method under the 45th order, umbellatæ. Corolla uniform, the umbel thick, and the fruit ovate. There is only one species, the Bunium bulbocastanum, with a globular root. It grows in moist places, and the roots are frequently dug up and eaten raw, having some resem
chesnut in taste.

BUNT *of a sail*, the midd
made with a hollow that it
wind. It is used mostly in
cause cour es are generally
Buntlines are small lines ma
bottom of the sails in the midd
bolt rope to a cringle and
through a small block seized
Their use is to trice up the
when furling it.

BUOY, a piece of wood or
rel narrow at each end, made
rectly over the anchor to
lies. Buoys are also fasten
over dangerous places, as roc
likewise in channels to gu
passing through.

BUPHAGA, in ornitholog
the order of picæ; the on
which is the Africana from
where it is a native. With
the beef eater from its some
on the backs of cattle, and
in them to get at the larvæ
deposited just below the
sect.

BUPHTHALMUM, *ox ey*
the polygamia superflua or
genesia class of plants, in
natural method under the 49
positæ. The receptacle is
paphus an indifferent
emarginated on the sides;
of the hermaphrodite flore
There are 12 species which
gated by seeds. The most re
1. Buphthalmum arborescen
to the height of eight or
flowers are of a pale yello
Buphthalmum helianthoide
of North America, and has
and an annual stalk, whi
height of six or eight feet. T
yellow.

BUPLEURUM, *hare's ea*
wax, a genus of the digy
pentandria class of plants;
natural method under th
umbellatæ. The involucra
umbels are large and penta
petals involuted; the fruit
pressed, and striated. The
cies, the principal of which
fruticosum, or shrubby Ethio
It grows to the height of fi
the leaves are of a sea-
placed alternately with yell
umbels at the ends of the
propagated by cuttings.

BUPRESTIS, a genus of
insects, remarkable for the
their colours. The antenn
and as long as the thorax
and filiform; head partly re
the thorax. The larvæ of th
said to live in the solid wo
trunks of decayed trees.
species.

BURCARDIA, a genus o
class and order pentandri
Calyx five-leaved; corolla
capsula angular, one-celled
seven or eight seeded. The
cies, which is an annual.

BURDEN *of a ship*, denot

will carry. It may be thus
; multiply the length of the
ed by the breadth of the ship,
the midship beam; and mul-
duct by the depth of the hold,
ide by 94, which will give the

GE, an ancient tenure in bo-
hereby the inhabitants hold
at a yearly rent; a dwelling-
borough was also called a bur-

RY, the breaking and entering
g house by night with intent
some felony. There must
ng and entry to complete the
there be day-light enough to
ountenance, it is no burglary.
ASTER, the chief magistrate
towns in Flanders, Holland,
ny.
NIA, in botany, a genus of
e monogynia order and hex-
s, ranked in the natural me-
the 5th order, coronariæ.
is small, and consists of three
ate, oblong petals, at the
e top; the fruit is an involu-
formed of three valves, with
ells, containing many small
re are two species.
G-GLASS, a convex or con-
commonly spherical, which
ed to the sun collects the rays
, where wood or any other
matter being put will be set
The convex burning glasses
rays of light, and in their pas-
hem towards the axis having
es of lenses. The concave
made of metal reflect the
ine them to a point in the
the property of mirrors, and
ng to the laws of reflection.
R, a round piece of steel,
ooth and give a lustre to me-
are different kinds, as strait,
Half burnishers are used
r.
P, or *Bilge pump*, differs from
pump in having a staff six,
t feet long, with a wooden
the leather is nailed, and
stead of a box. Two men
this staff, to the middle of
ned a rope for others to haul
ng it up and down.
n board ships, a small tackle,
two single blocks, for hoist-
gs in and out.
a genus of plants of the
mia class and order. The
e calyx is triphyllous, co-
ous; male capsule carnous,
nd monospermous. The
five petalled, stamina ten.
cies is, the Bursera gummi-
lemi, which is a native of
slands, and grows to a con-
ght and thickness. It bears
er, which are succeeded by
ed berries hanging in clus-
ed is hard and white, in-
a thin capsule. The fruit
lsam, which is esteemed a
ry, particularly for horses.
the bark a milky juice ex-
sumes a *resinous substance.*

BUSHEL, a measure for dry goods, containing four pecks or eight gallons. By 12 Henry 8 c. 5, a bushel is to contain eight gallons of wheat, the gallon eight pounds troy; the ounce twenty sterlings, and the sterling thirty-two grains or corns of wheat in the midst of the year. This standard bushel is kept in the exchequer. By an act made in 1697, every round bushel with a plain and even bottom eighteen and half inches in diameter and eight inches in depth is deemed a legal Winchester bushel.

BUSS, a small vessel used in the herring fishery, commonly from 48 to 60 tons burden.

BUTEA, in botany, a genus of the class and order diadelphia decandria; natural order papilionaceæ; calyx subbilabiate; corolla standard long and lanceolate; legume compressed, membranaceous, with one seed at the summit. There are two species; one an evergreen tree, about fifteen feet high, from which, when cut, exudes a gummy red juice. The second differs little from the first. They are both natives of the East Indies.

BUTNERIA, a genus of plants of the pentandria monogynia class and order. Corolla five petalled; filaments at top, connate with the petals; capsule five grained, muricate. There are three species, all shrubs, natives of America.

BUTOMUS, the *flowering rush* or *water gladiole*; a genus of plants of the hexagynia order, and the enneandria class of plants; in the natural method belonging to the 5th order, tripetaloideæ. Calyx none; petals six; and as many monospermous capsules. There is only one species, the butomus umbellatus, of which there are two varieties, the one with a white the other with a red flower.

BUTT, a measure of wine containing two hogsheads, or 126 gallons.

BUTT, or *butt-ends*, in a ship are the four ends of all planks under water as they rise, and are joined one end to another.

BUTTOCK *of a ship*, is the broad part immediately beneath the stern; and a ship is said to have a broad or narrow buttock according to her breadth at the transom.

BUTTON, an article to fasten clothes, made of metal, silk, mohair, &c. Metal buttons are formed two different ways; the blanks are pierced out of a sheet of metal, or cast. In the latter case the shanks are previously fixed in sand in the centre of the impression formed by each pattern, so as to have their extremities immersed in the melted metal. The former method is used for yellow buttons, and the latter for those of white metal. The metal for gilt buttons is an alloy of copper and zinc. This is rolled into sheets, and the blanks pierced out; they are then planished if for plain buttons, but if they are to be ornamented the die is now struck, unless great nicety is required, in which case they are wrought by the hand. The shanks made with an engine are attached to the bottom by a wire clamp, and a small quantity of solder and resin. They are then exposed to heat on an iron plate till the solder runs, and the shank becomes fixed to the but-

[illegible]

[illegible] in natural history, a [illegible] the button of a [illegible] there are three sorts, which [illegible] and consist of two bones. This term is also applied to a kind of slate which comes from Germany, that runs with ease into glass in a few hours. The Swedes and Germans make of it glass buttons, handles of knives, and other articles.

BUTTS or BACKS, a name given to the leather prepared from the heaviest ox hides; generally used for the soles of shoes.

BUXBAUMIA, in botany, a genus of the natural order musci, and belonging to the cryptogamia class of plants.

BUXUS, the *box tree*, a genus of the tetrandria order and monoecia class of plants; ranking in the natural method under the 38th order, tricoccæ. Male calyx triphyllous; the germen an embryo. Female calyx tetraphyllous; petals three and styles three; capsule three

[illegible], a private [illegible] company or corporation for [illegible] and good govern [illegible] its jurisdiction.

BYSSUS, in botany, a ge[illegible] belonging to the order alg[illegible] cryptogamia class. These most [illegible] posed of simple and uniform p [illegible] appear as excrescences of a [illegible] dusty matter. They are a gen[illegible] mushrooms and mosses. The[illegible] species, which grow on old wa[illegible] timber, &c. Byssus asbestinus [illegible] cies of asbestus or combustible [illegible] posed of parallel flexible fi[illegible] abounds in Sweden, and is c[illegible] or green. It easily melts into [illegible] dull colour. Byssus, in antiqui[illegible] fine Egyptian linen of which the [illegible] the Jewish priests were made.

BYSTROPOGON, in botany, [illegible] the didynamia gymnospermia [illegible] order. Calyx five subulated. [illegible] the opening; corolla upper [illegible] lower trifid; stamina distant. [illegible] seven species.

C

C, THE third letter, and second consonant of the alphabet, is pronounced like *k* before the vowels *a*, *o*, and *u*, and like *s*, before *e*, *i*, and *y*. As an abbreviation C stands for Cæsar. Centum a hundred, &c. In music C placed after the cliffs intimates that it must be played in

ship's anchor. Every cable [illegible] of three strands; each stra[illegible] ropes; and every rope of t[illegible] the twist being made of m[illegible] threads according to the int[illegible] ness of the cable. After th[illegible] made they use sticks which t[illegible]

flowers.
rhetoric, is the junc-
syllables, making a
sound. In medicine,
the organs of speech.
ng thistle: a genus of
r, and ico-andria class
ural method ranking
succulentæ. Calyx
ior, imbricated: corolla
an unilocular poly-
e inside of the plant
m, fleshy substance.
ruit like that of a pear
ntly acid. There are
s of the West Indies.
. Cactus cochenillifer,
inhabited by the co-
. Cactus grandiflora,
ereus, and the flower
but fades in a few

arrel. A cade of her-
nd of sprats 1000.
sic, is the termination
phrase on a perfect
it is a falling of the
-note at the close of
e manege, cadence, is
bserved by a horse in

is a civil judge, but in
he has cognizance of
Cadilescher is a su-

us of serpents without
three species. 1. Cæci-
e eel shaped cæcilia;
g and of a brown co-
s white. It is a native
. 2. Cæcilia glutino-
cæcilia, is about the
preceding, and also
nly it has a white stripe
3. Slender Cæcilia, is
g and the skin minutely

tome, the blindworm, or

nifying the "rest or other things being alike or equal."

CAFFA, painted cotton cloths brought from Bengal.

CAG or *keg*, a cask or vessel containing from four to five gallons.

CAHYS, a dry measure for corn, used in Spain, being about a bushel.

CAISSON, in military affairs, a chest of wood containing several bombs, but sometimes only filled with gunpowder. This is buried under some work which the enemy intend to take, and after they have obtained possession it is fired for the purpose of blowing them up. Caisson also denotes a frame used in laying the foundations of the piers of a bridge.

CALAMANCO, a woollen stuff made in England and Flanders, having a fine gloss. Some are quite plain, others flowered or striped.

CALAMINARIS, or *lapis calaminaris*, an ore of zinc of a spongy substance, yet very heavy.

CALAMUS, a genus of the monogynia order and hexandria class of plants; ranking in the natural method under the 5th order, tripetaloideæ. Calyx hexaphyllous. Corolla none. The fruit a dry monospermous berry, imbricated backwards. The only species is the Calamus rotang, whose stem is without branches and has a crown at the top. This is the real Indian cane, and grows in Sumatra. From it the drug called dragon's blood is obtained.

CALCAR, in glass making, a small oven or reverberating furnace, in which the first calcination of sand and salt of potash is made for the burning them into what is named *frit*.

CALCAREOUS, something partaking of the nature and qualities of calx or of lime.

CALCEOLARIA, in botany, a genus of the monogynia order and diandria class of plants.

CALCINATION, in chemistry, the reducing of bodies by fire to the condition of painters. In the human subject they occasion the jaundice.

CALCULI, *urinary*, concretions formed in the bladder and other urinary organs. They are usually spheroidal, and sometimes resemble a cluster of mulberries. In size they vary, some being very small and others as large as a goose-egg. In colour also they are different, some being of a deep brown, others white, and others of a dark grey. The surface of some is rough, others are polished like marble; sometimes they are found covered with semi-transparent crystals. The substances discovered in urinary calculi are, uric acid; that of ammonia; phosphate of lime; phosphate of magnesia and ammonia; oxalate of lime, silica, and animal matter. The cause of urinary calculi being unknown it is as impossible to prevent their formation as it is to discover a specific solvent. Solutions of potash and soda, and nitric or muriatic acid, are the best adapted for the purpose.

CALCULUS *Differentialis*, a method of differencing quantities or of finding an infinitely small quantity, which taken in an infinite number of times, shall be equal to a given quantity. An infinitesimal is a portion of a quantity less than a given one, and is therefore reckoned as nothing; whence two quantities differing by an infinitesimal are reckoned equal. Infinitesimals are also called differentials, when they are considered as the differences of two quantities. By Sir Isaac Newton they are called momenta as being momentary increments of quantities: as of a line generated by the flux of a point, &c. whence it appears that the calculus differentialis and the doctrine of fluxions are the same thing: the latter being the name adopted by Newton and the other by Leibnitz, who claimed the honour of the discovery. The only difference between them is in the way of expressing the differentials of quantities; Leibnitz and most foreigners denote them by the same letters as variable ones, prefixing to them the letter *d*, thus the differential of *x* is called *dx*, and the differential of *y*, *dy*, and *dx* is a positive quantity if *x* continually increase, and a negative if *x* decrease. Those who follow Newton instead of *dx* write *x* with a dot over it thus $\dot{x}$, and instead of *dy*, $\dot{y}$.

CALCULUS *exponentialis*, a method of differencing an exponential quantity, by which is meant a power whose exponent is variable as, x^x. a^x. The rule is, reduce the exponential quantities to logarithmic ones, e.g. Suppose the differential of the exponential quantity x^y be required.

Let $x^y = z$

Then will $y l x = l z$

$l x dy + y dx : x = dz : z$

$z l x dy + z y dx : x = dz.$

That is, $x^y\, l x dy + y x^{y-1} dx = dz.$

This calculus was invented by John Bernouilli, and is useful in invest
properties of exponential
CALCULUS, *integralis or*
the method of summing up
quantities, and the inverse of
lus differentialis. It is applied
metry, in the quadrature and
of curves, in cubing solids and
their surfaces, in the inverse
tangents and in the doctrine of
CALCULUS, *antecedental*, a
cal method of reasoning, without
ing motion, and applicable to
pose of fluxions. It was the
Mr. Glenie, who derived it
mining the antecedents of
given consequents, and a given
of comparison in the several
augmentation and diminution
undergo by composition and
tion.

CALEA, a genus of the poly
lis order, and syngenesia cla
in the natural method belong
49th order, compositæ. Recep
aceous, the pappus hairy, and
bricated. There are seven spe

CALENDAR or KALENDAR
count or division of time, acc
to the uses of life; and is the
sense as an almanack. The
from the Roman *Calenda*, wh
the first days of every month.
calendar was made by Romul
vided the year into ten mon
on the first of March, and con
days. Numa Pompilius refo
calendar by adding two month
making the year to consist of
This was farther improved
Cæsar, who made the year to
365 days 6 hours; and this per
the Julian, continued to be
used till 1583, when Pope Greg
reformed it, and the calendar
his name was adopted in all
but rejected by the protestants
when the German states refo
calendar. It was introduced into
in 1752. The *Julian Christian*
that in which the days of the wee
termined by the letters A, B, C,
G; by means of the solar cycle,
new and full moons, particular
chal full moon, with the feast
and the other moveable feasts, de
thereon in the Gregorian year.
formed or *corrected calendar* is
sets aside the golden numbers,
dominical letters, and determ
equinox with the paschal full
the moveable feasts, by astrono
culations.

CALENDER, a machine for
woollens, silks, and linens, to ma
smooth and glossy. It con
heavy wooden cylinders, round
stuffs to be calendered are wo
rollers are placed between
boards, the lower one fixed, and
per moveable by means of a
a rope fastened to the spindle; th
is loaded with heavy stones, which
gives the polish.

CALENDS, among the Romans,
days in every month. Instead of
ing forwards as we do, the Roma
oned backwards; therefore to

n or eight feet. It
y cuttings.
er incidental to hot
e patient imagines
fields, and if not
overboard. Vomits
proper remedies.
iter Compasses, an
sing the diameters
also the cylinder of
d howitzers. These
ched legs, that the
e extremities of the
true diameter of a
quadrant fastened to
through the other
d parts: the length
is usually from six
these are inscribed
tions, &c.
st ecclesiastical and
e Mahommedans.
D, in chronology, a
years perpetually re-
elapsed the middle
nions return, accord-
benian, who was the
ue day of the solar

rs, a whistle or pipe
n and his mates to
heir duty.
Ethiopian arum, a
inia order, and gy-
nts, ranking in the
r the second order,
e four species, the
h is the Calla Æthio-
tive of the Cape of

enus of plants of the
traudria monogynia.
corolla four cleft;

their colour, it is usual to tinge the mordants with a colouring matter which is usually Brazil wood. After the mordants have been applied the cloth must be made completely dry; and then it is to be washed with warm water and cow dung till the thickening matter, and those parts of the mordants uncombined with the cloth are removed. After this the cloth is thoroughly rinsed in clean water. The dye stuffs used by callico printers are indigo, madder, quercitron, bark, and weld. Indigo not requiring any mordant is applied at once with a block or pencil.

CALLIGONUM, in botany, a genus of the polyandria digynia class of plants, without a flower: the fruit is an oval, compressed, striated, hairy pericarpium, with bifid tops, turning backwards; the seed single. There are three species.

CALLIGRAPHY, the art of fair writing: whence calligraphus denoted a copyist or scrivener among the antients, his office being to transcribe fair what notaries had taken down minutes of.

CALLIONYMUS, the *dragonet*, a genus of fishes of the order of jugulares: there are three species: 1. The Lyra, which abounds in the German ocean, and the Mediterranean; it is often found in the stomach of the cod-fish. 2. The Dracunculus, which is found on the coast of Italy. 3. The Indicus, a native of the Asiatic seas.

CALLISIA, a genus of the monogynia order, and triandria class of plants, in the natural method ranking under the 6th order, ensatæ. Calyx triphyllous; petals three; anthera double; capsule bilocular. There is only one species, which is a native of America.

CALLITRICHE, or *star grass*, a genus of the monogynia order, and triandria class of plants. Calyx spreading, five petalled; nectarium five-leaved; capsule five-celled. It is a native of the Cape of Good Hope.

CALOMEL, dulcified sublimate of mercury.

CALOPHYLLUM, a genus of the polyandria monogynia order and class of plants The corolla consists of four petals: the fruit is a large globose druped: there are two species.

CALORIC, the substance which produces heat. It is a fluid extremely elastic and subtle. Caloric is diffused through all bodies with which it combines, and is therefore not to be had in a state of absolute purity. As it is perfectly elastic and its component particles would expand ad infinitum if not impeded, all bodies combined therewith would expand in like manner if there was no power opposed to counteract the elasticity. This power is the mutual attraction of the particles or cohesion. All material bodies are therefore continually acted upon by two powers which tend to equipoise each other, one causing the particles of bodies to recede and the other to approximate, and according to the proportion of these powers so is the form of bodies. If cohesion predominates they are solid; and if this power be overcome the particles recede and the volume is increased. If caloric predominates so that the particles of bodies are removed from the sphere of reciprocal attraction they become liquid. A third power which preserves bodies from passing into an aeriform state is the atmosphere without the influence of which all bodies would be solid or gaseous. Hence all bodies combined with caloric, may exist in three different states, in consequence of, 1. The power of attraction by which the particles cohere. 2. The quantity of caloric combined with the substance. 3. The greater or less pressure of the atmosphere.

CALOTTE, in architecture, a round cavity used to diminish the elevation of a chapel, cabinet, alcove, &c.

CALTHA, *marsh marygold*, a genus of the polyandria polygynia class of plants, ranking in the natural method under the 26th order multisiliquæ. Calyx, none; petals five; nectarium, none; capsule many and polyspermous. There is only one species

CALVARY, in heraldry, a cross resembling that on which our Lord was crucified.

CALUMET, a symbolical instrument used by the American Indians. It is a pipe made of a soft red stone with a long tube of reed ornamented with feathers. This is produced in assemblies for debating on war or peace and the acceptance of the calumet is considered as a concurrence with the measures proposed; and the refusal of it a mark of rejection.

CALX, properly signifies lime, but chemists use the word for a fine powder which remains after the calcination or corrosion of metals and mineral substances

CALYCANTHUS, a genus of the polygynia order and icosandria class of plants, in the natural method ranking among the galious order. Calyx, monophyllous,

pitcher form, squarrose,
loured leaves, the corolla
leaves on the calyx, the
each having a glandular
many, each with a hair w
calyx. There are two sp
canthus floridus or Carolin
2. Calycanthus præcox, t
vated with us, but the othe
CALYCIFLORÆ, acco
is the 16th order in the c
consisting of plants which
inserted into the calyx.
CALYPTRA, among bot
membranaceous volucrum
conical form which cover
fructification.
CALYPTRANTHES, a ge
sandria monogynia class
plants. Calyx, superior;
vered with a vial shaped
none; berry one celled, one
There are six species Wes
CALYX, in botany, the c
or that part of a plant which
supports the other parts of
CAMÆA, in natural hi
the semipellucid gems o
and formed on a chrystallin
onyx. There are four spe
CAMAX, in botany, a ge
and order pentandria m
rolla wheel-shaped; fila
between the segments
berry four-celled many se
tive of Guiana
CAMBER-BEAM, a piec
archwise or with an obtu
middle, commonly used i
CAMBLET or CAMLET
composed of a warp and
tured in a loom. Some a
hair, others of wool and th
of silk and hair.
CAMBOGIA GUTTA,
monogynia order and pol
plants, ranking in the n
under the 39th order, tri
tetrapetalous; calyx tetra
a pome with eight cells a
It is a native of the Eas
duces the resinous gum
CAMBRIC, a fine whi
flax, so called from Cambr
originally manufactured.
CAMELLIA, a genus
delphia polyandria class
natural method ranking
order columniferæ. Caly
polyphyllous, with the
larger than the exterior.
species natives of China
is a tree and greatly admi
gant variety of its flowers
leaves.
CAMELOPARDALIS,
logy, a genus of the order
full grown it is near seven
the top of the head to the
horns differ from those
drupeds, forming a part
consisting of a porous
covered with short coar
middle of the forehead is
The tail is of a moderate
minates in a tuft of hair.
of the body is thick and m
hind part thin and meagr

s and Africa. Its general
t six feet and a half; but
of the head when elevated
n. The head is small, neck
of a meagre shape, the legs
tail reaches to the joints
gs, the feet are large and
e hoofs; the under part of
vered with a tough pliable
ables the animal to travel
sandy and stony places. On
e six callosities; and at the
he breast is a large rough tu-
s species has a single bunch
. The general colour is a
n and the hair which is fine
air into stuffs. 2. Camelus
or Bactrian camel resembles
r but is larger and has two
its back. It also exceeds
camel in swiftness. 3. Ca-
a, or the Peruvian sheep
South America where it in-
ountains. It has been how-
cated by the inhabitants. It
e size of the stag, and the
y long. The colour is a light
amelus vicuna. This species
he glama, but is smaller
ry fine and makes beautiful
[illegible] parts, this is a native of
the inhabitants keep vast
e sake of the wool. The con-
ed bezoar stones are found in
of this as well as of the former
amelus huanacus or guanaco,
f Peru. Its general colour is
and white below. 5. Came-
os, is an inhabitant of Peru
d is about six feet in length
eight. In its general appear-
ables the ram, and is employ-
t of burden and in ploughing.
see *Camera*.

OBSCURA, or *dark chamber*,
a machine or apparatus re-
n artificial eye; on which the

class of plants and in the natural method of the 29th order, campanaceæ. There are 78 species, the principal of which are, 1. Campanula Canariensis, is a native of the Canaries. The leaves are of a sea green colour, and when they first come out, are covered with an ash coloured powder; the flowers are of a flame colour, striped with brown. 2. Campanula decurrens, the peach leaved bell flower, is a native of the northern parts of Europe. Some have blue flowers and others white. 3. Campanula hybrida, or Venus's looking glass. This was formerly cultivated in our gardens but has been superseded by the speculum. 4. Campanula latifolia, or greater bell-flower has a perennial root, and strong, round, single stalks. The flowers are blue, purple and white. 5. Campanula medium, the Canterbury bell-flower is a biennial plant. 6. Campanula pyramidalis has thick tuberous roots, and grows to the height of 4 feet. The flowers grow from the sides of the stalks: some blue and others white. 7. Campanula rapunculus the rampion, has radish fleshy roots, and is cultivated in France for sallads. 8. Campanula speculum, with yellow eye-bright leaves. This is an annual plant with slender stalks rising a foot; the flowers which are of a beautiful purple come out from the wings of the leaves close to the stalks. 9. Campanula trachelium, with nettle leaves has a perennial root and stiff hairy stalks; the flowers are blue and white.

CAMPHOR, a concrete juice extracted from the wood of the laurus camphora. Pure camphor is white and pellucid, unctuous, of a bitterish aromatic taste, and of a fragrant smell. It is extremely volatile and combustible. Camphor has long been a valuable article in the materia medica, being one of the most efficacious diaphoretics, and much esteemed for its use in malignant fevers and epidemical diseases. Camphoric acid is the result situation of the ground, its vicinity or connection with rivers, the ease or difficulty with which a proper quantity of water can be procured, with a variety of other points which must be taken into consideration before such a work be entered upon. When the ground is naturally level and unconnected with rivers the execution is easy, and the navigation is not liable to be disturbed by floods: but when the ground rises and falls, and cannot be reduced to a level, artificial methods of raising and lowering vessels must be used which vary according to circumstances.

A *Lock* is a bason placed lengthways in a canal lined with walls of masonry on each side and terminated by two gates, placed where there is a cascade or natural fall of the country; and so constructed, that the bason being filled by an upper sluice to the level of the waters above a vessel may ascend through the upper gate; or the water in the lock being reduced to a level of that at the bottom of the cascade, she may descend through the lower gate, for when the waters are brought to a level on either side the gate on that side may be easily opened. The side walls of a lock must be very strong; and where the natural foundation is bad they ought to be founded on piles and platforms of wood.

CANARINA, a genus of the order monogynia and hexandria class of plants. The calyx is six leaved; corolla six cleft and bill-form. There are two species.

CANARIUM, a genus of the dioecia order and pentandria class of plants. It has both male and female flowers; in both the calyx has two leaves, and the corolla is three petalled. The fruit is a drupa with a three-cornered nut. There is only one species.

CANCER, in astronomy, one of the twelve signs of the zodiac represented on the globe in the form of a crab. It is the fourth constellation, and gives name to a quadrant of the ecliptic called the *tropic of Cancer*, which is a lesser circle of the sphere parallel to the equator and passing through the beginning of this sign.

CANCER, in medicine, a roundish, unequal, hard, livid tumour, generally in the glandulous part of the body and is so called because it has turgid veins shooting from it resembling the crab fish.

CANCER, in zoology, a genus of insects of the order aptera. They have in general eight legs besides two large claws. The two eyes are elongated and moveable and at a considerable distance from each other. There are 87 species, the most remarkable of which are 1. Cancer astacus, or the craw-fish, which inhabits rivers lodging in holes in the banks. 2. Cancer atomos, or atom lobster, with six pair of legs, it can hardly be seen but by the microscope. 3. Cancer crangon, the shrimp with long slender feelers and claws with a moveable fang. 4. Cancer stagnalis, is found in shallow pools of rain water and is very transparent. 5. Cancer diogenes, soldier crab, or hermit crab, with rough claws. It inhabits the empty cavities of turbinated shells, and changes its dwelling according to its growth. 6. The strigosus or plated lobster, has its *thorax* elegantly plated. The largest of
this species does not exceed
length. It is found on the
glesea. 7. Cancer gammarus, the
lobster, inhabits the rocky
deep water. Lobsters are apt
claws when it thunders or
cannon. Some are taken by
the greatest quantity in a
made of twigs and baited w
Lobsters begin to breed in
tinue breeding most part of the
Above 12,000 eggs have been
the tail of one. These are
sand where they are soon
sters change their shells
while they are acquiring a
seek a lonely place to escape
voured by their own tribe.
crabs renew their claws when
torn off. 8. Cancer granul
shelled crab. This species is
but the legs are small. The
large and flat. The shell
green. 9. Cancer grapsus, or
tled crab, has a round body,
the claws are red and the
mal is mottled with red and
crabs are very nimble and
sides of rocks with great agility.
horridus, the horrid crab, is a
and inhabits the rocks on the
11. Cancer locusta, or locust
bounds in summer on our
stones and leaps about with
12. Cancer mænas, the common
lurks under stones or in the
Cancer pagurus, or the black
inhabits the rocky coasts and
delicate food. 14. Cancer pi
crab from the size of its body.
the muscle which on that account
ed poisonous. 15. Cancer pulex,
lobster, is common in fountains
lets swimming swiftly on its back.
cer ruricola, the land crab, or
inhabits the Bahamas and the
between the tropics. These
in the mountains, but once a
march down to the sea in a body
ing of many millions. After
some weeks those who arrive
their spawn into the water
fish are ready expecting this
ply. The eggs that escape are
under the sand, and not long
of young crabs quit the shore
up to the mountains. These crab
various sizes. They bite very
with their nippers which they
in the wound. 17. Cancer
prawn, is frequent among loose
the sea shore; they are
fresh, but become red by boiling.
cer squilla resembles the
not so large. It is taken on the
Kent and is sold in London
name of the white shrimp.
velutinus, or velvet crab inhabits
of Anglesea. 20. Cancer vocans,
crab, is of a small size and of a
lour. It has eight legs and
The head has two square
which the animal thrusts out
pleasure. They are found in
tries.

CANCROMA, or *boat-bill*, a
birds of the order of grallæ.
two species. 1. Cancroma

ick of which usually
of cotton, twisted to-
andle should be half
llock's tallow; and the
nd properly twisted.
of tallow candles, the
, and moulded. The
y chopping the fat and
r; when the tallow is
inder is pressed, and
is called *greaves*, with
ks are fed. When the
order, the workman
ouches, and immerses
ded thereon into the
hung on a frame to
ey are dipped again
of a proper size. The
candles consists of a
several hollow metal
tremity of these is a
y, having a hole in the
to pass through. The
nto the shaft of the
ust through the aper-
it comes out of the
d of the cotton is fas-
perpendicular situa-
le of the candle; the
ed with warm tallow
as candles are cast
by the hand. In the
s softened in hot wa-
s then taken out and
round the wick which
that they begin with
diminish towards the
a method of making
adle; a dozen wicks
d an iron circle over
ed wax; a ladle full
ently on the tops of
dles are of the requi-
fterwards rolled and
ut-free table with a
l box. Wax tapers
nner of wire by two
turned by a handle

the tail of the Great Bear and Bootes's arms above the Coma Berenices. According to the British catalogue there are twenty-five stars.

CANINE *teeth*, in anatomy, are two sharp edged teeth in each jaw on each side, between the incisures and molares.

CANIS, the *dog*, in zoology, a genus of quadrupeds of the order of feræ. The dog has six grinders in the upper and seven in the lower jaw. Those called *dog teeth* are four, one on each side, both in the lower and upper jaw. There are 24 species. 1. Canis familiaris *or* common dog, the origin of which is uncertain. The varieties are numerous; and according to Buffon, the shepherd's dog approaches nearest to the original animal. Similar to this but larger is the dingo or New Holland dog, which is tamed with difficulty. The Pomeranian dog is distinguished by upright ears, long hair on the head, and a curved tail. This dog is generally white. The Siberian dog is nearly allied to the last mentioned; it is used in Kamtschatka for drawing sledges. The Iceland dog does not differ much from these. It has a short muzzle, upright ears, and is covered with rough black hair. The water dog has curly hair like wool. It is fond of the water and the feet are nearly webbed. The great water spaniel possesses similar qualities, as does the little barbet. The Newfoundland dog is large and remarkably fond of the water. He is also distinguished by fidelity and sagacity. King Charles's dog is so called from its having been a favourite with Charles II. It is nearly related to the small water spaniel, and is generally black. The Maltese dog is also a small kind of spaniel and white. Of the hound there are some varieties. The old English hound is of great size and strength. It is remarkable for the quickness of its smelling. The blood hound is larger and stronger than the preceding. The pointer is chiefly employed in finding partridges and other game. The Dalmatian or coach [illegible] upper part [illegible] of it is [illegible] temperate and [illegible] the globe, but has long been extirpated from England and Ireland. Its general colour is a pale grey. No other animal will feed on the flesh of the wolf, and the only useful article belonging to it is the skin.

3. Canis Mexicanus, or Mexican wolf, in its general appearance resembles the preceding, only it is larger, the colour of the body is cinereous and spotted with yellow. Above the mouth are several large bristles. 4. Canis lycaon or black wolf, is found in Europe and America, and the northern parts of Asia. It is smaller than the common wolf. 5. Canis hyæna, is a native of Asia and Africa, and is about the size of a large dog. Its colour is a pale brown with a tawny cast and the body marked by black transverse bands running downwards. The hyæna inhabits caverns and rocky places; roves about in the night in quest of prey. They assemble in troops and follow the movements of an army to feast on the slain. Notwithstanding the savage malignity of this animal, it has been rendered as tame as a dog. 6. Canis crocuta or spotted hyæna; resembles the preceding but is larger and marked all over with black spots. It is a native of Africa. 7. Canis aureus, or jackal, is a native of Asia or Africa. It is of the size of a dog and of a yellow colour. It resides in rocky places and chiefly hunts in the night. Frequently the jackals go out in troops making dreadful howlings which frighten deer, antelopes, and other timid animals. The nois

[illegible]
are [illegible]
[illegible]
This ki
Ireland.
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fox, is la
resembles
Falkland i
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or zerda, is
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is black.
so swift as
feeds on in
barks like

CANIS
lation of the
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CANIS
of the northe
ing two sta
cho five, an
fifteen.

CANKER,
arising chief

orce of gunpowder. The
are the cascabel, mouldings
-hole, vent-field, reinforced
ing, cornice ring, neck, muz-
, or cylinder. The propor-
for brass cannon, are as fol-
of metal fit for casting they
opper, 52lb. of brass, and
. This is the mode at Wool-
use 100lb. of copper, 6lb.
of tin; and some again
per, 10lb. of brass, and 15lb.
are principally used in
n adapted for a long engage-
are distinguished by the
the balls they carry. The
length is, that it be such
e of powder be on fire before
he piece. Formerly cannons
onger than they are now.
n found that a ball moves
mpetus through a less space
one, and that an iron ball of
rther from a short cannon
9lb. does out of a longer
eas in other respects the
re and ball the greater the
longer cannon also requires
ge of powder than the shor-
ary charge is that the weight
r be half that of the ball.
n Indian boat formed of the
e hollowed and sometimes of
s joined together. The larg-
s of the cotton tree, some of
carry 20 or 30 hogsheads

in ecclesiastical law, a rule
regarding the policy or go-
f a church. The *canon law*
n of canons made at different
rch government. *Canon* also
ote a residentiary clergyman

composition.

CANTONED, in architecture, is when the corner of a building is adorned with a pilaster, an angular column, rustic quoins, or any thing which projects from the wall. In heraldry *cantoned* or *cantonned* is the position of such things as are borne with a cross, &c. between.

CANVASS, unbleached cloth of hemp or flax, woven regularly in little squares, and used for working tapestry. Also a coarse cloth of hemp used for making ships' sails, &c. Among painters it is the primed cloth on which their pictures are drawn.

CANZONE, in music, is a song wherein some little figures are introduced, and *canzonetta* is a diminutive of the same.

CAOUTCHOUC, *elastic Resin* or *Indian Rubber*, a substance which exudes in the form of a milky juice from two trees in South America, the hævea caoutchouc, and the jatropha elastica. Several trees in the East Indies produce the same substance. Caoutchouc when pure is white, and without taste or smell. Its dark colour is owing to the method employed in drying it on the moulds. A thin coat of the juice is spread upon the mould and then exposed to smoke; afterwards another coat is spread on, which is dried in the same way. Caoutchouc is soft and pliable, and exceedingly elastic. It is soluble in volatile oils and alkalies. When exposed to heat it melts readily, but never regains its former properties. It burns with a light flame and fetid odour. This substance is usually imported in the shape of bottles marked with various figures.

CAP, in a ship, is a square piece of timber put on the head of the mast for fixing the topmast in, and supporting the execution, *after* judgment, being of divers kinds.

CAPILLARY TUBES, in physics, little pipes, whose channels are very minute.

CAPILLARY *vessels*, see *Anatomy*.

CAPITAL, in architecture, the uppermost part of a column or pilaster, serving as the head or crown.

CAPITULATION, a treaty made between the inhabitants or garrison of a place and the besiegers for the delivering it up on certain conditions.

CAPONIERE or *Caponniere*, in fortification, a work sunk on the glacis of a place about four or five feet deep, and the earth which comes out of it serves as a parapet in which loop holes are made for the men to fire through.

CAPPADINE, a sort of silk flock, taken from the upper part of the silk-worm cod after the real silk has been wound off.

CAPPARIS, a genus of the monogynia order and polyandria class of plants, in the natural method ranking under the 25th order, putaminæ. There are 15 species, of which the principal is the *Capparis spinosa*, or common caper, a shrub generally growing out of the joints of old walls or the fissures of rocks in the warm parts of Europe. The berry makes an excellent pickle.

CAPRA, the *Goat*, in zoology, a genus of quadruped of the order of pecora, of which there are nine species and varieties viz. 1. Capra Ibex, is found in several parts of Europe and Asia. It dwells in mountainous parts and is an animal of great strength and agility. The colour is a greyish brown. The head is small in proportion, but the horns are large and long. 2. Capra Ægagrus, or Caucasan Ibex is larger than the common goat and in some degree resembles a stag. Its general colour is brown or grey, and the forehead is black, which colour is continued down the back in the form of a stripe. The chin has a large brown beard and the horns which are large bend considerably backwards. The female has neither horns nor beard. It inhabits the highest parts of mount Caucasus and is strong and swift. 3. Capra Hircus, or common goat, is found in almost every part of the globe. The colour is various being black, brown, white or spotted. The flesh is good when young, and the skin is used for making gloves. The goat goes with young four months and a half. The leather made of the skin of the Chamois goat is highly esteemed. The following are the principal varieties of the common goat. 1. Capra Mambrica or Syrian goat is remarkable for its ears which are long and pendulous. 2. Capria Angorensis, or Angora goat is generally of a milk white colour, short legged, with black, spreading spirally twisted horns and the hair on the body hanging in spiral ringlets. From this hair fine camblets are made. 3. Capra depressa or African goat is a very small kind found in some parts of Africa. 4. Capra reversa or Whidah goat, is also a dwarf variety found in Africa, where it is much esteemed as an article of food. 5. Long horned Whidah goat. 6. Capricorn goat.

CAPRARIA, *sweet weed*, a genus of the angiospermia order, and didynamia class of plants; ranking in the natural method
under the 40th order, persona
are five species.

CAPRICORN, one of the twe
of the zodiac, represented on the
a goat. It is the tenth in the or
and contains 28 stars accordin
and Tycho; 29 according to He
51 in the Britannic catalogue.
capricorn is a lesser circle of
parallel to the equinoctial, and
grees 30 minutes distance from
south.

CAPRIMULGUS, *the goat*
genus of birds of the order
There are two species, 1. the
which feeds on moths, gnats, &c.
pears in May and leaves this
August. 2. The Americanus
and a native of America.

CAPSICUM, *Guinea pepper*, a
the monogynia order and pentan
of plants: in the natural meth
under the 28th order, luridæ.
ficilated, and the fruit a berr
are five species, the principal
are, 1. Capsicum annuum, the
long podded capsicum, which
in our gardens. Of this there
riety with red and another
fruit. 2. Capsicum baccatum,
per, rises with a shrubby stalk
feet high; the fruit grows at
of the branches, standing er
are small, oval, and of a brig
form what is called Cayenne
Capsicum grossum, the bell pe
fruit of this is red and is the only
for pickling.

CAPSQUARES, in gunnery,
plates placed over the trunnions
to keep it in the carriage.

CAPSTAN, or *main capstan*, is
a large piece of timber resembl
lass, and placed upright behind
mast with several holes for
wooden bars. Its use is to we
or to strike or hoist up the to
Capstan jear, is placed between
mast and mizen for the purpose
upon any rope.

CAPSULE, among botanists,
of pericarpium or seed vessel.

CAPSULÆ ATRABILIARIÆ,
glandulæ renales, two glands
pressed figure situated on each
upper part of the kidneys.

CAPTAIN, an officer in the
commands a troop of horse or
of foot. He ranks next to the
captain of a man of war is the c
of a ship from 20 guns upwards.

CAPTION, in law, is where a
sion is executed and the com
subscribe their names to a cer
claring the performance of the
It also denotes the taking a pers
tue of a writ.

CAPURA, in botany, a genus
and order hexandria monogyn
none; corolla six-cleft; stamina
tube; germen superior; stigma
pericarpium berry. There is one
which is a native of the East Indies.

CAPUT DRACONIS, the *Drag*
in astronomy, the ascending
moon; also a star of the first mag
the head of the constellation

'UCM, in chemistry, the remaining after distilla-

ɩ kind of short musket, ! 24 in the lb.

genus of insects of the ere are 34 species chiefly their colour. The most e crepitans or bombardier . It conceals itself among ɩ touched emits a noise a blue smoke. Its chief er species of the same r. When pursued the down in the path of the ıd on its approach dis- which makes the other ɩ the bombardier taking fright gets into a crevice

architecture, denotes a lix or spiral form.

rr it, a weight used by termine the fineness of ded into degrees to dis- ater or lesser quantity of in the gold. Carat is also y jewellers for weighing and pearls. It weighs h of which is divided into

n the east signifies a com- nts or pilgrims who travel sat security

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

stane-files, consisting of apertures in which the various colours are applied. These patterns are painted with oil colours that the brushes may not wear them out; and when the pattern is laid on the pasteboard, a brushful of colour is slightly passed over it, which leaving it within the openings forms the figure of the card

CARDAMINE, or *Lady's smock*, a genus of the siliquosa order and tetradynamia class of plants. There are 18 species, the principal of which is the Cardamine pratensis with a large purplish flower. It grows naturally in many parts of England, and is also called cuckoo flower. There are four varieties.

CARDAMOM, see *Amomum.*

CARDIA, or CARDIUM, in natural history, a genus of the vermes testaceæ, the shell of which is formed of two ovals. There are 21 species some nearly globose, others triangular, and others oblong. Under this genus are comprehended cockles, ark shells and the pectini inauriti, or scallops without ears.

CARDIAC *Medicines*, are those which strengthen the heart and the vital forces.

CARDIALGIA, the heartburn, a disorder of the stomach attended with anxiety, nausea, and a disposition to vomit.

CARDINAL, in the Roman church, an ecclesiastical officer of the highest rank, next to the pope. The cardinals form the pope's council, and out of their number he is elected. They wear a rochet, a short purple mantle, and a red hat.

CARDINAL *Points*, are the four intersections of the horizon with the meridian and the prime vertical circle, and called the four points of the compass.

CARDIOID, in geometry, an algebraical curve, so called from its resemblance to a heart.

CARDIOSPERMUM, the *heart pea*, a genus of the trigynia order, of the octandria class of plants, in the natural method ranking under the [illegible] order, [illegible]. Calyx tetraphyllous; petals [illegible]; nectarium tetraphyllous [illegible]; capsules three grown together and [illegible]. There are three species natives of the East and West Indies.

CARDUUS, the *thistle*, a genus of the polygamia æqualis order, of the syngenesia class of plants, and in the natural method ranking under the 49th order, compositæ. Calyx [illegible] imbricated with prickly scales and receptacle hairy. There are [illegible] species, of which [illegible] are natives of britain.

CARDUUS [illegible] *Centauria*

C[illegible], in [illegible] is [illegible] the purpose of [illegible] and [illegible] the other

CAREX, [illegible] the mo- [illegible] of plants, [illegible]

[illegible]

triangular and within the nectarium; style short; stigmata, two or three. The seed which is single is ovate and triangular. There are 97 species.

CARICA, the *papaw*, a genus of the decandria order and dioecia class of plants, in the natural method ranking under the 38th order, tricoccæ. Male calyx almost none; corolla quinquefid; corolla pentapetalous with five stigmata; the fruit a unilocular and polyspermous berry. The species are, 1. Carica papaya, which grows to the height of twenty feet and naked till near the top. The leaves are large and the flowers bell shaped and yellow. When these fall away the germen swells to a fruit of the size of a melon. This and all parts of the tree abounds with a juice used to kill ring worms. The fruit is made into a pickle, and the buds of the female flowers into a sweetmeat. 2. Carica prosoposa has a branching stalk, and the flowers are of a rose-colour, the fruit is shaped like a pear and sweeter than the papaya. Both species are natives of the East and West Indies.

CARIES, in surgery, a mortification of the bones arising from a vitiated state of the animal fluids, or from external injury.

CARINA, in anatomy, a term used for the fibrous rudiments or embryo of a chick, appearing in an incubated egg.

CARISSA, a genus of the monogynia order and pentandria class of plants; ranking in the natural method under the 30th order, contortæ. It has two berries, many-seeded. There are two species, both trees, and natives of Africa.

CARLINA, one of the species of the thistle whose roots are used in medicine. They have a strong smell, and a subacrid, bitterish, weakly aromatic taste. They are accounted warm alexipharmics and diaphoretics.

CARLINGS, in a ship, are two pieces of timber, lying fore and aft, from beam to beam, for the ledges to rest on to which the planks are fastened.

CARLOCK, a kind of isinglass made of the madder of the sturgeon. It is chiefly used to clarify wine; also by dyers.

CARMINATIVES, medicines used in colics or other flatulent disorders to dispel wind.

CARMINE, a red powder used in miniature painting. It is said to be extracted from cochineal by means of water, in which chouan and antour have been infused; some add rocou but this gives it too much the cast of opal. Others make carmine with Brazil wood fernambouc, and leaf-gold, beaten in a mortar and steeped in white wine vinegar: the scum which arises upon boiling being the carmine though of inferior quality.

CARN, *Cairn*, or *Carnedde*, in British antiquity, denotes heaps of stones supposed to be remains of Druidical temples, or sepulchral monuments.

CARNEL, a term among shipwrights for building vessels with their timbers and beams first, and afterwards laying on the planks to distinguish it from clinch work.

CARNELIAN, *sarda*, in natural history, a precious stone, of which there are three sorts, the red, the yellow, and the white. The finest carnelians are those of the East

Indies; but there are very
found in the rivers of Silesia
and we have some tolerably
land. The antients attributed
nary medical virtues to the
but at present it is only used
seals.

CARNIVOROUS, a term
those animals which eat flesh
thence called birds and beasts

CAROLINEA, a genus of the
phia polyandria class and order
essential character is, monog
lyx simple, tubular, truncate;
form; pome five grooved,
There are two species natives
and Tobago.

CAROTEEL, an uncertain
quantity of goods. A caroteel
is from four to five hundred,
from five to nine, of mace
hundred, &c.

CAROTIDS, in anatomy, two
of the neck which convey the
the aorta to the brain.

CAROXYLON, a genus of the
dria monogynia class and order
whose essential character is,
petalled; nectaria five leaved
ing, inserted into the corolla
clothed. There is only one spe

CARPESIUM, a genus of the
polygamia superflua class and
plants. Calyx imbricated,
naked. There are two species

CARP, see *Cyprinus*.

CARPET, a sort of stuff wr
the needle, or on a loom.
Turkish carpets are in most
we have excellent ones ma
land, particularly at Kidderm
weaving carpets the design
is traced in its proper colours
tied before the workman w
knows what colours and shades
and how many stitches of the
In this he is assisted by squares,
again are subdivided into pa
responding with the threads of

CARPINUS, the *hornbeam*, a
polyandria order and monoec
plants, ranking in the natural
under the 50th order, amentac
calyx monophyllous and cilia
none; stamina 20. Female
as the male, corolla none;
with two styles on each. The
egg-shaped nut. There are th
Carpinus betulus, or common
which is a deciduous tree and
Europe and America. 2. Carp
the hop hornbeam is a native of
Virginia. 3. Carpinus Virginia
ering hornbeam.

CARPODETUS, a genus of the
dria monogynia class and order
Calyx five notched; corolla five-
stigma flat-headed; berry glo
celled. It is a native of New Ze

CARRONADE, a short kind
nance capable of carrying a large
useful in close engagements
was first used at Carron, whence

CARROT, see *Daucus*.

CARTHAMUS, a genus of the
polygamia æqualis, and syngenes
plants, in the natural method ra
der the 49th order, composit

ed with scales close below with su[illegible] ous he top. There are nine spe- pal of which is the cartha- with a saffron coloured native of Egypt and the used for dyeing.

, in anatomy, a substance the nature of bones but lu- and elastic.

NOUS *Fishes*, have their ted by cartilages instead of bones. They have also a of breathing, sometimes and sometimes by the gills. udes the shark, lamprey,

CARTOON, in painting, on strong paper [illegible] ed to the fresh plaister of inted in fresco. Those of se by Rubens for Charles Windsor are [illegible] in the on.

, in architecture and ornament representing a —in military affairs car- oden case to hold musket

a case of pasteboard or ngth [illegible] cannon [illegible] mortars are [illegible]

[illegible]

rent terminations of nouns, expressing the several relations which they bear to each other and to the things they represent. Among *printers* case is a sloping frame divided into several compartments, containing types or letters from which the compositor takes what he wants to compose a page or form. *Case of crown glass*, contains twelve, fifteen, or eighteen tables, according to the quality. *A Case of Newcastle green glass* contains thirty-five tables.

CASE HARDENING, a method of preparing iron to render its outer surface capable of resisting any edged tool.

CASE SHOT, are musket balls, stones, old iron, &c. put into cases and fired out of great guns.

CASEMENT or *Casemate*, in architecture, a hollow moulding which some make one sixth of a circle, and others one-fourth.

CASERN, in fortification, a building in garrison towns generally near the ramparts for lodging the soldiers.

CASHEW NUT, see *Anacardium*.

CASING *of timber work*, among builders, is the plastering a house all over on the outside with mortar and striking it while wet by a ruler with the corner of a trowel to make it resemble the joints of free-stone.

CASKETS, [illegible]

[illegible]

CASSIOPEIA, a constellation in the northern hemisphere opposite the Great Bear on the other side of the pole. It contains according to Ptolemy 13 stars; to Tycho 26; and to Flamstead 56. In 1572 a remarkable new star appeared in this constellation seemingly larger than Jupiter but in 18 months it disappeared.

CASSITERIA, in natural history, a genus of crystals whose figures are influenced by an admixture of tin. There are two sorts one white and the other brown: both found in abundance in Devon and Cornwall.

CASSOWARY, see *Struthio.*

CASSYTA, a genus of the monogynia order and enneandria class of plants. Corolla in the form of a calyx and divided into six segments: nectarium composed of three truncated glands encompassing the germen; the interior filaments glandular: and the drupe contains a single seed. There are two species.

CAST, in the east denotes a tribe or number of families of the same rank and profession. There are four of these: 1. The bramins which is the mos noble: 2. That of the rajahs or princes: 3. That of the choutres which include traders and artificers, and lastly the parias the lowest of all and which is held infamous. Every profession is confined to its proper cast.

CASTILLANE, a gold coin current in Spain worth 14 rials and 16 deniers. It is also the name of a Spanish weight being the hundredth part of a pound Spanish.

CASTILLEIA, a genus of the didynamia angiospermia class and order of plants, calyx tubular, compressed; upper lip bifid, lower none; corolla lower lip trifid, capsule two celled. There are two species natives of South America.

CASTING, among sculptors, is the taking casts and impressions of figures, busts, medals, &c.

To take a copy or cast from any figure, it is necessary to obtain a mould by pressing thereon some soft substance, and when this becomes hard another substance is to be poured into it, which will be a representation of the original form.

The substances used for this purpose are various. If the sculpture lies horizontally after oiling it, plaister of Paris may be used, pouring it thereon to a convenient thickness. A composition of bee's wax, rosin, and pitch is also good. But if the situation of the object be perpendicular, then clay, or something similar must be used. This is to be spread out to the size of the figure, and must be first sprinkled over with whiting, to prevent it from adhering to the original. Bee's wax and dough, or the crumb of new bread may be used for small subjects. When there are under cuttings in the bass relief, they must be filled up, else the mould will not come off. If the original subject is round, or projects much, the mould must be divided into several parts. It is sometimes necessary to cast several parts separately, and afterwards to join them together. In this case the plaister must be tempered with water to the consistence of soft paste and laid on with an instrument to every part of the surface. When the model is covered the whole must be left

to set; then divided into p
to its being taken off from t
cutting with a thin bla
mould being formed and
parts put together, it mus
and placed in a position th
may lie upwards, and th
plaister mixed with wate
cast is set, it must be ta
mould and repaired wh
If the mould is large, a
placed within to produc
cast and to save the plaiste

In the same manner figu
of lead or any other meta
of plaister or clay, taking c
be perfectly dry.

To take a cast in met
animal, insect, or vegeta
animal in a box by a strin
legs, wings, &c. and so
leaves, &c. of a vegetable
of Paris mixed with talc
pered to a proper consiste
and the sides of the box
must be put to the princ
body, and pieces of wire to
of the other parts; that t
when drawn out channel
the metal and vents for the
plaister is hard, the stick, w
may be removed. The m
be put into a moderate he
is nearly dry into a greate
increased till the whole i

To take casts from me
must be first made gene
of Paris, or of melted
oiling the surface, put a
round the medal, standing
face according to the thic
tended mould. Then m
with water to the consis
and with a brush rub it
of the medal, after which
by pouring on more plais
till it is hard enough to
pare it smooth on the bac
the weather is damp it sh
the fire. Sulphur must
upon silver medals as it w
To prepare the mould for
or plaister of Paris is, ta
boiled linseed oil and oil o
ounce, and mix them in
wanted pour some into
the surface of the moul
the mould has sunk int
again till the oil begins to
it, then wipe it with c
hard, and lay it up to dry.
of Paris in this mould pro
ner already directed for
self, first oiling it with o
phor casts be required, it
in an iron ladle.

To cast isinglass.—Diss
over the fire; then with
it on the medal and let it
hard raise the isinglass wi
knife, and it will come of
isinglass may be made o
mixing the proper colou
may be gilded with gold l
imitate a copper medal,
mine with the isinglass,
thereon by breathing on t

the tail nearly one
a deep chestnut, but
The hair is fine and
le resort of the bea-
ery and woody places,
hey assemble in great
a social state, and
ings in an admirable
y assemble, which is
and have fixed on the
shment, on the banks
begin by cutting down
largest tree they can
it fall across the
r at from the branches
own smaller trees,
piles, interweaving
e larger stakes, and
als with earth. The
der part of the river,
cularly, but the rest
upwards to bear the
eam. On the great
et their cabins, which
are for going on the
throwing themselves
form of these cabins
to ten feet diameter.
or four stories, and the
eet thick, raised per-
ts or stakes. They are
are plastered within
pplication of the mor-
of their tails as trow-
plastering. Each cabin
old bark and young
favourite food, some
enty or twenty-five
number is twelve,
ont in two, four, or
e have as many as
enerally as many fe-
the alarm of danger,
warning by striking
tail, the noise of

[illegible] plants, of which there are five species, natives of New South Wales.

CASUISTRY, the science which examines doubtful cases in morality, and decides scruples of conscience.

CAT, see *Felis*.

CAT-*harpings*, are small ropes running in blocks from one side of the ship to the other, near the deck, to tighten the shrouds for the security of the mast.

CAT-*heads*, short pieces of timber in a ship, one projecting over each hawse with shivers for heaving up the anchor, and keeping it clear.

CAT-*salt*, a term applied to a beautiful granulated kind of common salt, formed of the bittern or leach brine, which runs from the salt as it comes out of the pan. It is used in making hard soap.

CATACAUSTIC *curves*, in the higher geometry, are the species of caustic curves formed by reflection. The catacaustic of a circle is a cycloid formed by the revolution of a circle along a circle. The caustic of the vulgar semi-cycloid, when the rays are parallel to the axis, is also a vulgar cycloid, described by the revolution of a circle on the same base. The caustic of the logarithmic spiral is the same curve in a different position.

CATACHRISIS, in rhetoric, a trope in which the name of one thing is used to express another.

CATACOMB, a grotto or subterraneous place for the interment of the dead.

CATALEPSY, a kind of apoplexy or lethargic disease in which the patient is taken speechless and fixed in the same posture.

CATANANCHE, *Candia lion's foot*, a genus of the polygamia æqualis order, and syngenesia class of plants, in the natural method ranking under the 49th order, compositæ. Receptacle paleaceous; calyx imbricated; pappus furnished with its capsula by which vision is impeded or destroyed.

CATARRH, a defluxion from the head upon the mouth and aspera arteria and thence upon the lungs.

CATASTROPHE, in poetry, is the fourth and last part of the antient drama. The catastrophe is only the winding up or developement of the plot.

CATECHU, improperly called terra japanica a concreted vegetable juice partly gummy and partly resinous.

CATEGORY, in logic, a series or order of all the predicates or attributes contained under any genus. Aristotle made ten categories, viz. quantity, quality, relation, action, passion, time, place, situation, and habit.

CATENARIA, in the higher geometry, is a curve line formed by a rope hanging from two points of suspension whether the points be horizontal or not.

CATERPILLAR, in zoology, the name of the butterfly class of insects in their reptile or worm state. See *Papilio*.

CATESBÆA, the *lily thorn*, a genus of the monogynia order and tetrandria class of plants; in the natural method ranking under the 28th order luridæ. Corolla monopetalous, funnel shaped; stamina within the throat; fruit a polyspermous berry. There are two species. 1. Catesbæa spinosa, a native of the island of Providence and discovered by Mr. Catesby. It grows to the height of 10 or 12 feet and the flowers are of a yellow colour. 2. Catesbæa parviflora.

CATGUT, a small string for violins and other musical instruments; made of the dried intestines of sheep.

CATHARTICS, in medicine, remedies of a purgative quality.

CATHETER, a tube to be introduced into the bladder in order to discharge the urine when suppressed. The best catheters are made of elastic gum.

CATHETUS, in geometry, a line falling perpendicularly on another; the catheti of a right angled triangle are the two sides including the right angle. In architecture *cathetus* is a perpendicular line supposed to pass through the middle of a cylindrical body.

CATOPTRICS, is that part of optics which explains the properties of reflected light and particularly that which is reflected from mirrors.

CATURUS, in botany, a genus of the diocesia triandria class and order. There are two species, natives of the East Indies.

CAVALIER, nearly the same as knight, signifying a military person on horseback. In fortification it is the elevation of earth situated in the gorge of the bastion bordered with a parapet and cut into embrasures for a defence of the ditch, &c.

CAVALRY, a body of soldiers that charge on horse back.

CAVAZION, in architecture, the hollow trench made for laying the foundation of a building.

CAUCALIS, a genus of the pentandria digynia class of plants, of which there are nine species.

CAUDA *draconis*, the Dragon's tail in astronomy, is the name of the moon's descending node.—*Cauda Leonis*, is a star of
the first magnitude in the tail
stellation Leo.

CAVEAR or *Caviar*, the sp
roes of sturgeon made into
and dried in the sun.

CAVEAT, a caution entered
ritual court to stop probates,
tions, licenses, dispensations,
from being granted without th
of the party who enters the ca

CAVEDO, a Portuguese
length equal to $27\frac{357}{1000}$ Eng

CAVETTO, in architectu
member or round concave mo
taining a quarter of a circle.
as an ornament for cornices.

CAVIA, in zoology, a genu
der of glires. These animals
getables and inhabit excav
ground or beneath the roots
principal of the genus are, 1. C
variegated cavy or guinea pi
cleanly and dress their fur li
male and female sleep altern
the watch for mutual safety.
ca or spotted cavy, is a na
America and inhabits holes
of rivers. It resembles a
been called the hog rabbit.
Americans prize it as an ar
3. Cavia capybara. This spe
sidered by Linnæus as a kin
called by him sus hydroch
to a large size and inhabits
it feeds on sugar canes and
caudata aguti. This species
Guiana and is of the size of
its motion resembles that
burrows in the woods an
lives in hollow trees, fro
fruits, &c. 5. Cavia agut
leporine cavy seems to be a
preceding. It is a native
is about the size of a hare.
chy is smaller than the agu
olive colour. It is also a na
America. 7. Cavia aperea,
is a native of Brasil and p
qualities of the rabbit and th
lour is that of the hare, an
white.

CAULICOLES, or *Caulic*
ture, are eight stalks in the
pital, springing out from fou
or cauls.

CAULKING, is the driv
into the seams of the plank
keep out the water. After
stopped they are done over
tallow, pitch and tar, boiled

CAULIFEROUS, among b
applied to those plants whic
fect caulis or stem.

CAULIFLOWERS, see

CAUSALTY, among
lighter sulphureous, and
ores, carried off in wash
collected in heaps and
again.

CAUSE, that from whenc
ceeds or by virtue of wh
done: it stands opposed to

CAUSTICS, remedies fo
destroying the acrimony
and vicious parts. Substan
are poisonous when taken

CAUSTIC CURVE, in ge

the natural method
53d order dumosæ.
of which the princi-
americanus, it grows
gher than three feet,
n are white, grow at
es.
nus of the diandria
lass of plants, in the
king under the 53d
ere is one species, a
of South America.
r and *Pinus*.
any, a genus of the
and pentandria class
ral method ranking
miscellaneæ. There
l Barbadoes bastard

itecture, the top or
, or the covering of
iled to the bottom of
he upper room on
g joists.
gic, a mode of syllo-
ajor and conclusion
ve propositions and
al affirmative.
staff tree, a genus of
r and pentandria
the natural method
53d order dumosæ.
s and patent; cap-
and trilocular; the
are 22 species, two
own in this country.
, a shrub which is a
bou. four feet high.
e and in their native
eded by beautiful
Celastrus scandens,
een and the berries

, the English name of
m graveolens. The
be sown at two or

of plants; ranking in the natural method under the 53d order, scabridæ. It is an hermaphrodite plant, and there are seven species all of them deciduous. The principal are, 1. Celtis australis, which is a native of Africa and the south of Europe. 2. Celtis occidentalis, a native of Virginia. The wood of this tree is used by coach-makers. 3. Celtis orientalis, is a native of Armenia and grows to the height of twelve feet. The flowers and fruit are yellow.

CEMENT, a substance which unites and keeps things together. There are various kinds.

Jewellers cement is made by applying gum mastich to the broken fragments of a precious stone, which must be heated sufficiently to melt the gum.

Turkey cement for joining metals, glass, &c. Dissolve mastich in as much spirit of wine as will preserve it liquid; and in another vessel dissolve as much isinglass, previously soaked in water, brandy, or rum, as will make two ounces of strong glue, and add a small quantity of gum galbanum or ammoniacum; then mix the whole with a sufficient heat; keep it in a phial and when wanted for use set it in hot water.

A cement for broken china, glass, &c.—Take quick lime and white of eggs, or a thick varnish; temper them well together and it is fit for use. Drying oil and white lead are also frequently used for china: but when it is not necessary the vessel should endure heat or wet, isinglass glue and tripoli, or chalk is preferable.

A cement for turners.—Take resin one pound, pitch ¼oz melt them together and while boiling add brick-dust till it is hard enough, then pour it into water and make it into rolls for use.

A cement for electrical purposes.—Melt one pound of resin over a slow fire, add as much plaster of Paris in powder as

To solder or cement broken glass.—This is to be done by interposing between the broken parts, glass ground up like a pigment, and exposing them to such a heat as will fuse the cement without affecting the parts to be joined. A glass to cement broken pieces of flint glass may be made by fusing some of the same kind of glass reduced to powder with borax.

Cement for Derbyshire spar and other stones. This may be made with about seven or eight parts of resin, and one of bees wax, melted together with a small quantity of plaister of Paris. When these are well mixed and nearly cold, the whole must be kneaded together. The pieces to be joined must be heated before the cement is applied.

A cement for joining the flanches of iron cylinders and other parts of hydraulic machines.—Boil linseed oil, litharge, and red and white lead to a proper consistence and apply the same on each side of a piece of flannel shaped to fit the joint. This cement will also answer well for joining broken stones and cisterns.

Another cement for steam engines.—Take two ounces of sal ammoniac, one ounce of flower of sulphur and 16 ounces of cast iron filings: mix them well together by rubbing in a mortar. When wanted for use take one part of the powder and twenty parts of clear iron borings or filings and blend them by grinding in a mortar, wet the compound with water, and apply it, when brought to a consistence, to the joints with a wooden spatula.

Blood cement.—Coppersmiths lay over the rivets and edges of sheets of copper in large boilers a cement made by mixing powdered quicklime with ox-blood: but it must be applied as soon as made.

Japanese cement, for tea trays, dressing boxes, &c. Mix rice flour intimately with cold water and then boil it gently. It is beautifully white, very adhesive, and almost transparent.

CEMETERY, a place set apart for the burial of the dead.

CENCHRUS, in botany, a genus of the polygamia monoecia class of plants. There are two flowers, one male and the other hermaphrodite. The species are eleven.

CENOTAPH, an empty tomb, being a kind of honorary monument erected to the memory of persons not interred near the place.

CENT, in commerce, an abridgement of centum used to denote the profit or loss arising from the sale of a commodity, the interest of money, rates of insurance, &c. In brokerage cent is applied in a different manner; for if a broker or agent takes one-eighth per cent, it means one-eighth of a pound, that is 2s. 6d. for every 100l. he negociated. Cent is a coin in America of which there are one hundred to a dollar.

CENTAURUS, in astronomy, a constellation of the southern hemisphere, commonly joined with the Wolf. In Ptolemy's catalogue it has 37 stars, in Tycho's 4, and in Flamstead's 35.

CENTAUREA, a genus of the polygamia frustranea order, and syngenesia class of plants, ranking in the natural method under the 49th order, compositæ.

There are 77 species, the
which are, 1. Centaurea
blue-bottle, which commonly
corn. The juice of the
this flower makes a beauti
Centaurea glastifolia. The
species is used in medicine a
gent and a vulnerary.

CENTER or *Centre*, a point
tant from the extremities of
body. *Center of a bastion*, is
a point in the middle of the
the capital line commences,
at the angle of the inner
of a conic section, is a point
diameters intersect each
a curve of the higher kind,
where the two diameters
all the diameters join Sir I. N
the point of coincidence a
Center of a dial is that
axis of the world intersects
the dial: and that also
hour lines meet. *Center of gra*
chanics, is that point about
parts of a body balance each
of oscillation, that point of a
which, if the weight of the
was collected, each vibra
performed in the same time a
weights are separate. The
pension is the point on which
lum hangs. *Center of per*
ing body is that point where
tient force is greatest. *See*

CENTNER, among metall
weight divisible into a hund
terwards into lesser parts.
of metallurgists is the comm
weight; but that of assayers

CENTRAL *forces*, the
cause a moving body to *tend*
recede from the center of

CENTRIFUGAL *force*, that
all bodies that move round
in a curve, endeavour to fly
axis of their motion in a
periphery of the curve, and
point of it.

CENTRIPETAL *force*, that
body is every where impelled
towards some point as a cent
vity or that force by which all
to the center of the earth;
attraction, whereby the load
iron; and that force by which
are drawn continually back
lined motions, and made
curves.

CENTRISCUS, a genus of
ing to the order of amphibia
are two species, 1. The
its back covered with a bony
in a sharp spine under which
but the back fins are between
spine. It is a native of the
2. The scolopax has a rough
and a straight extended tail.
belly-fins with four rays
teeth. It is found in the Me

CENTRUM *tendinosum*, in
point where the tendons of the
the diaphragm meet.

CENTUNCULUS, a genus of
led by some *anagallidastru*
others a species of *anagallis*.
to the tetrandria monogynia
flower is monopetalous, the

oval seg-
r capsule,
nis. There
ual.
of the te-
lants. Co-
slender;
e fruit an
cell. The
g. There
ans of Chi-

r disorders

ay, is that
tween the
s into two

nstellation
containing
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stead 35.
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ound, and
Under this
ra beetle.

enus of the
plants, the
bifid pe-
unilocular
dish seeds.
Is species.
externally
hose of the
nds, white,
ercurial ce-

of the mo-
nts, having
ssed bicot-
leons.
or St. John's
order, and
he natural
l order, lo-
rodite and
; stamina
men coria-
also dioe-
n different
Ceratonia
l italy. It
the hedges,
which are
They are
f a griping

nus of the
ia class of
anking un-
Male calyx
amina from
x multipar-
one; sty e
There are

monogynia
f plants, in
under the
uit is a mo-
e 5 species,
he Cerbera
rm parts of
eight of 8 or
l of a milky
loose bun-

ches at the end of the branches; and are of the colour of cream. The wood of this tree is very fœtid and the kernels of the nuts are a deadly poison.

CERCELE, in heraldry, is a cross which opens at the ends and turns both ways like a ram's horn.

CERCIS, the Judas tree, a genus of the monogynia order and decandria class of plants, ranking in the natural method under the 33d order lomentaceæ. Calyx quinquedentated and gibbous below; corolla papilionaceous: it is a leguminous plant. There are two species both deciduous. The principal is cercis Canadensis which will grow to the height of 20 feet. The flowers are of a pale red and are often eaten as a sallad, they also make a good pickle.

CEREBELLUM, in anatomy, the hinder part of the brain.

CEREBRUM, the brain, a part whose structure and uses anatomists have not yet ascertained.

CERINTHE, *honey wort*, a genus of the monogynia order and pentandria class of plants ranking in the natural method under the 41st order, asperifolia. There are two species natives o Germany, Italy, and the Alps. They are low annual plants with purple, yellow, and red flowers.

CEROPEGIA, a genus of the pentandria monogynia class of plants. The flower consists of a single petal, and the fruit is two cylindraceous, acuminated floscules containing one cell divided by two valves. The seeds are numerous. There are six species.

CERTHIA, the creeper, or ox-eye a genus of birds belonging to the order of picæ. There are 50 species, the principal of which are, 1. The familiaris, or common ox-eye, which is grey above and white below with brown wings, and white spots on the prime feathers. This bird is common in our island and runs with great facility on the bark of a tree. Its food is chiefly insects. The eggs which are generally five are ash-coloured, spotted. 2. The hook-billed green creeper is a native of the Sandwich islands. The inhabitants of which make use of its feathers to form their ornamental dresses. 3. The pusila is of a brown colour with a gloss of copper, and white beneath. It is a native of the Cape of Good Hope, and fond of honey. 4. The Loteni, or Loten's creeper, has the upper parts of a green gold colour; beneath from the breast to the vent is of velvet black, which is divided from the green at the neck by a bright band of violet. This elegant bird inhabits Ceylon and Madagascar. 5. The cerulea or blue creeper, has the head of a fine blue and on each side a stripe of black in which the eyes are seated; the rest of the body is a violet blue, except the chin and throat, which are black. Its nest resembles a retort and the neck is a foot long. 6. The sannio or mocking creeper, is about the size of a thrush. The head is inclined to a violet colour, and the general plumage is olive green. It is an inhabitant of New Zealand, it has the faculty of imitating the notes of other birds.

CERTIORARI, an original writ, issuing *out of the court of* chancery or king's bench directed to the inferior courts commanding them to certify or to return the records of a cause depending before them, that more sure and speedy justice may be had before the king or such judges as he shall appoint to determine the same.

CERVICAL *nerves*, are seven pair of nerves, so called as having their origin in the cervix. Cervical vessels denote the arteries, veins, &c. which pass through the vertebræ of the neck to the skull.

CERVIX, in anatomy, is the hinder part of the neck.

CERUSE, white lead, a sort of calx of lead made by exposing plates of that metal to the vapour of hot vinegar.

CERVUS, the stag or deer kind, a genus of quadrupeds of the order of pecora. The species are: 1. Cervus alces or elk. This is the largest of the genus and when full grown is about the size of a horse. The neck is short and thick; the head large, the horns spreading into a broad palmated form. It is an inoffensive animal and feeds on the boughs of trees. The female has no horns. In Europe the elk is chiefly found in Sweden, Norway, and Russia: and the largest are in Siberia. In America they are most common in Canada where they are called moose-deer. 2. Cervus tarandus or reindeer, is an inhabitant of the northern regions chiefly in Norway, Lapland, Greenland and in Siberia. The height is about five feet and the legs are shorter in proportion than those of the stag. The general colour is brown above and white beneath; but as it grows older it becomes of a grey-white. The horns are long and slender, and they besides have a pair of brow antlers with tips which expand forwards. The Laplanders use this animal for various purposes to draw their sledges and to supply them with milk. 3. Cervus elaphus or stag, is of an elegant figure. It varies in different climates both in size and colour; the general height is three feet and a half, and the colour a reddish brown. The usual number of branches in the horns of a well grown stag are six or seven. It generally casts or sheds its horns in March and at the end of June they are full grown. 4. Cervus dama or fallow deer, is smaller than the stag, and of a brown-bay colour and whitish beneath. 5. Cervus Virginianus, Virginian deer, is a native of North America where it associates with its own tribe in great numbers. In size it resembles the fallow deer, and the colour is a light brown. 6. Cervus axis or spotted axis, is a beautiful species, about the size of the fallow deer and in colour a light rufous brown marked with white spots. It is an eastern animal. 7. The middle axis; this appears to be only a variety of the preceding and is in size between the spotted axis and the great axis. The colour is the same as the former but without spots. It is a native of Ceylon, Borneo, Celebes and Java. 8. Great axis. The existence of this variety is ascertained by a pair of horns in the British museum, which measure two feet nine inches in length. It is supposed they were brought from Ceylon or Borneo. 9. Cervus pygargus, or tailless roe is a native of Russia and Siberia. It resembles the roebuck, but is larger and instead of a tail has a broad cutaneous excrescence. 10. Cervus Mexi-
canus or Mexican roe, is of a
lour spotted with white. 11
cinius, or porcine deer, has
thirteen inches long: the
animal is two feet two
thick and the colour brown.
capreolus or common roe, is of
brown colour, three feet
height 2 feet 7 inches, and the
horns six or eight inches.
bitant of Europe and Asia.
muntjac, or rib-faced deer is a
Java and Ceylon. It is less
buck, and what principally
it is the appearance of these
subcutaneous ribs extending
horns to the eyes. A tusk
each side of the upper jaw.
guineensis or grey deer
cat, and of a grey colour
black spots and lines. It is
Africa.

CESARE, in logic, one of the
the second figure of syllog
nor proposition of which is
affirmative and the other tw
negatives.

CESTRUM, *bastard jas*
the monogynia order and
of plants; ranking in the
under the 28th order luridæ.
nel shaped; stamina
tooth from the middle. They
shrubs and natives of
flowers are of a white
colour.

CETUS, in astronomy, a
the southern hemisphere
stars by Ptolemy's catalogue,
and in Flamstead's 97. In th
tion is a star which appears
pears periodically.

CETE, the seventh order in
malia class of animals; whose
are breathing apertures on the
horizontal, claws none. All
of this tribe are of the whale
ceous fishes breathe by
being destitute of gills, whence
obliged to rise frequently
to sleep on the surface of the
have also the power of
and like land animals they
young.

CHÆROPHYLLUM,
of the digynia order and
of plants: ranking in the
under the 45th order umbell
are 10 species two of which
weed and wild chervil are com
in many parts of Britain.
the first are poisonous.
yield a yellow dye; and the
stalks are green.

CHÆTODON, a genus of
ing to the order of thoracici.
are numerous, thick, setaceous
the rays of the gills six. The
that at the anus are fleshy
There are 23 species. The
able is the acuminatus of
with a hollow cylindrical
native of the East Indies
by catching flies.

CHAFF, in husbandry, the
separated by screening or
also the rind of corn, and
for the use of cattle.

CHAIN, in surveying, is a

te, the brownish
id red chalcedony.
celand, the Fero
s. When striped
n, it is called *onyx*.
y *chalcedonyx*
easure containing
but on board a
e allowed to the
ght to weigh one

calcareous earth,
and affording an
useful for a variety
ularly in making

law of England,
to jurors, either in
. In cases of high
treason the pri-
to the number of
der and other te-

application given
ted with particles

of shell-fish of the
shell is thick and
are 14 species prin-
the figure of the
he most remarka-
nerus or Venus's

dwarf palm, or lit-
, a genus of the na-
e. Hermaphrodite
rolla tripetalous:
three, and three
The male is a
the hermaphrodite.
e principal is the
native of the West
a. The leaves are
a fan. They are
nth in some coun-

by the value of the thing multiplied by the probability of losing it. If from the expectation which the gamester has of winning the whole sum deposited the sums he had deposited are subtracted, there will remain the gain, if the difference be positive, or the loss if negative. Again if from the expectation which each gamester has of the sum deposited by his adversary the risk of losing what he has himself deposited be subtracted there will also remain his gain or loss. If there be a certain number of chances whereby the possession of a sum can be secured and a number by which it may be lost, that sum may be insured for that part of it which shall be to the whole as the number of chances there are to lose is to the number of all the chances. If two events have no dependance on each other, so that p be the number of chances by which the first may happen, and q the number by which it may fail; and r be the number of chances by which the second may happen, and s the number of chances by which it may fail; multiply $p + q$ by $r + s$, and the product $pr + qr + ps + qs$, will contain all the chances by which the happening or failing of the events may be varied among one another. Hence it follows that if a fraction expresses the probability of an event, and another fraction the probability of another event, and these two are independent, the probability that both events will happen will be the product of the two fractions. See Simpson on the Nature and Laws of Chance, Demoivre on Chances, &c.

CHANCE MEDLEY, in law, is the accidentally killing of a man but not wholly without fault in the person who kills. It is also called manslaughter by misadventure.

CHANCELLOR, an officer supposed to have been originally a scribe or notary under the emperors; and named cancellarius because he sat behind a lattice cal-

CHANCELLOR *of the Exchequer*, is an officer who presides in that court and takes care of the interest of the crown. He is in commission with the lord-treasurer for letting the crown lands, &c. and has power with others to compound for forfeitures of lands upon penal statutes: he has also great authority in managing the royal revenues and the national finances.

CHANCELLOR *of the order of the garter*, is an officer who seals the commissions and mandates of the chapter, keeps a register of their proceedings and delivers acts thereof under the seal of the order.

CHANCELLOR *of a university*, is generally one of the principal nobility and is the chief magistrate thereof. He seals diplomas, &c.

CHANDILIER, in fortification, a kind of moveable parapet, consisting of a wooden frame serving to support the fascines for covering the pioneers. It is also used in approaches, galleries, and mines, to protect the workmen.

CHANNEL, in architecture, that part of the Ionic capital which is under the abacus. *Channel of the larmier* is the hollow soffit of a cornice making the pendant mouchette. *Channel of the volute*, in the Ionic capital is the face of the circumvolution inclosed by a listel.

CHANTLATE, in building, a piece of wood fastened near the end of the rafters, and projecting beyond the wall to support two or three rows of tiles to prevent the water from running down the walls.

CHAOS, that confusion in which matter lay when first produced from nothing at the beginning of the world. It is represented by the antients as an egg, and called the seed or first principle of nature.

CHAOS, in zoology, is the name of a genus of insects belonging to the order of zoophyta. The body has no covering, and revives after it has been apparently for some time dead. It has no joints or organs of external sensation. There are five species obtained by infusing vegetables in water.

CHAPEAU, in heraldry, an antient cap of dignity worn by dukes, being scarlet-coloured velvet on one side and lined with fur.

CHAPPE, in heraldry, the dividing an escutcheon by lines drawn from the centre of the upper edge to the angles below, into three parts, the sections on the sides being of a different colour from the rest.

CHARA, a genus of the monandria order, and monoecia class of plants. Female calyx tetraphyllous; corolla none; stigma quinquefid, with a round seed. There are four species.

CHARACTER, in a general sense denotes a mark or figure serving to represent things or ideas; thus letters are characters or types of certain sounds; words of ideas, &c. Also marks or abbreviations used in some sciences to denote particular words.

CHARACTER, in poetry, is the result of the manners or peculiarities by which one person is distinguished from another. Among naturalists, it is synonymous with the definition of the genera of animals, plants, &c.

CHARADRIUS, in ornithology, a genus of birds, belonging to the order of grallæ.
The species are 27 or 28; the
are, 1. The Alexandrian
colour, with the forehead,
belly white, the prime
white, and the legs black. It
of a lark, and feeds on
Ægyptius has a black streak
white eye brows, the prime
streaked with black at the
bluish legs. It is a native
The morinellus has an
breast, a small white streak
and eye-brows, and black legs
in Cambridgeshire,
Derbyshire. 4. The
above, with green spots,
neath, and the feet are
is the green plover of Ray,
of Europe. 5. The oedic
curlew of Ray is of a grey
two of the prime wing
white in the middle: it
and ash-coloured feet; and
size of a crow. In Hamp
and Lincoln it is called the
birds feed on worms and
will also catch toads and

CHARCOAL, a kind of
or fuel, consisting of woo
and chiefly used where a
fire is necessary. The
it is simple. The wood is
nearly of the same size,
disposed in heaps, and
earth so as to prevent all
with the air, except what
make the wood burn, and
oil and water formed durin
tion; they are then kindl
they have burnt a sufficie
fire is extinguished by stop
through which the air was

CHARGE, in gunnery, th
powder and ball with w
loaded. The weight of
commonly one-half or on
the ball. In the navy the
32 pounders is 7-16ths of th
ball. Different charges of
the same weight of ball, pr
velocities, which are in th
ratio of the weights of pow
the weight of powder is the
ball varied, the velocity is
cal subduplicate ratio of
the ball. *To Charge*, in mil
is to attack the enemy col
with horse or foot.

CHARGE, in heraldry,
the figures represented on

CHARLES'S-WAIN, in
ven stars in the constellatio
major or the Great bear.

CHART, an hydrographi
projection of some parts
plano, for the use of navi
are of different kinds.

As, 1. *Plane Chart*, is a
of some part of the superfi
raqueous globe, in which
are supposed parallel to
parallels of latitude at e
and consequently the degr
and longitude every where

2. *Mercator's Chart*, is th
meridians are straight lin
each other, and equi-distan
are also straight lines and p

l the distance between them
from the equinoctial towards
the ratio of the secant of the
the radius. See *Navigation*.
Chart, is a meridional pro-
ere the distance of the eye
plane of the meridian, upon
projection is made, is supposed
to the sine of the angle 45d.
comes nearest to the na-
globe, because the meridians
at equal distances, as also are
ls, consequently the several
he earth have their proper
of magnitude, distance, and
on the globe itself.
(*Magna*), the great charter
granted first by King John,
ds with alterations confirmed
t by Henry III.
R, a deed whereby the king
t to one or more persons, of
lic.
R PARTY, is a contract exe-
he freighter and the master
ship, containing the terms
upon which the ship is
ght.
large tract of ground lying
r, being of the middle kind,
rn and a forest. In the Sea
nce means to pursue a ship.
are those which run out at
tern.
S, all kinds of goods and
veable or otherwise, except

r *check roll*, a book contain-
s of those persons who are
the king or other great per-
rk of the check in the royal
an officer who has the con-
eomen of the guard, ushers,
ks of the check in the dock
e regulation of the persons
erein.
drafts on bankers, are bills
e to the bearer by those who
n the banker's hands. They
d from the stamp duty, but
negotiable with other bills.
t to be presented on the day
ived.
in heraldry, is when the
art of it as a bordure, &c. is
squares or checquers.
mong mechanics, are those
chines or instruments which
and exactly alike. In ship
e cheeks are two wooden
h side of the mast at the top,
in them called hounds,
h the lines run to hoist the
uppermost piece of timber in
the ship is also called the
the sides of a block or of a
bear the same name.
n article of food prepared of
, separated from the whey,
rds dried for use. It is a
nion that old cheese digests
but is left undigested itself.
ithout foundation. Cheese
ep's milk digests sooner than
; and the cheese from goat's
than either. Cheshire and
ire are the most famous coun-
e.

CHEIRANTHUS, stock gilliflower and wall flower; a genus of the 39th natural order, siliquosæ, and of the tetradynamia class of plants. There are 22 species, the principal of which are, 1. Cheiranthus annuus, or ten week's stock, with an upright smooth woody stalk, divided into a branchy head, with spear-shaped leaves, and the branches terminated by numerous flowers of different colours. 2. Cheiranthus cheiri, or the common wall flower. 3. Cheiranthus incanus, the hoary cheiranthus which grows to the height of two or three feet. The two last are hardy evergreen biennials, or triennials, but the first must be propagated by seeds sown every year.

CHEKAO, a paste prepared by calcination and trituration from a stony substance, and used by the Chinese for drawing the elegant figures on the fine china ware which is all white.

CHELIDONIUM, *celandine*, horned or prickly poppy; a genus of the 27th natural order, rheadeæ. Corolla tetrapetalous; calyx diphyllous, the siliqua unilocular and linear. There are five species. The cheliodunium majus grows among old walls and waste shady places. It is of a blueish green colour, yielding a yellow juice, which is deemed serviceable in curing warts, tetters, ring-worm, itch, and spots on the eyes.

CHELONE, a genus of the angiospermia order, and didynamia class of plants; and in the natural method ranking under the 40th order, personatæ. Calyx quinquepartite; the rudiment of a 5th filament among the highest stamina; capsule bilocular. There are five species, all natives of North America, and perennial herbaceous plants. The flowers are red, blue, and purple.

CHEMISE, in fortification, is the wall with which a bastion or bulwark of earth is lined for greater strength and security. *Fire-chemise* is a piece of cloth steeped in combustibles, and used at sea to set fire to the ship of an enemy.

CHEMISTRY, that science whose object is to ascertain the principles of which bodies are composed, to examine their nature, the manner in which they combine and the properties resulting from their combination. The word *chemistry* is supposed to be derived from the Arabic to *conceal*, and it probably referred to the profound secrecy observed by the old alchemists in their operations, which had for their object the discovery of the transmutation of metals into gold, and the finding out an elixir for the prolongation of life. Notwithstanding these extravagant pursuits, we are indebted to those visionaries for many valuable hints, and important discoveries. Within the last thirty years, chemistry has been cultivated with uncommon ardour by men of the first talents, and so successful have they been in their pursuits, that an entire new language has been formed on regular principles, by which this science is reduced to almost a perfect system.

A course of chemical study may be distributed into four parts. The first relating to simple bodies, the second to those which are formed by the union of two of these, and therefore called compound bodies of the first order, the third relates to those bodies which are formed by the union of two compound bodies, and the fourth to bodies as they appear in the animal, vegetable, and mineral kingdoms.

1. *Simple Bodies.*—These are so named because they have not been decompounded, and they may be reduced to six classes.

1. Oxygen.
2. Simple combustibles.
3. Metals.
4. Earths.
5. Caloric.
6. Light.

Oxygen. This substance is named after two Greek words, signifying the production of acid, because one of its properties is to form various acids, by combining with different substances, called the bases of the acids. If the fresh leaves of plants are placed under a glass vessel filled with water, inverted in that fluid, and then exposed to the sun, they emit bubbles of air, which collect at the top of the vessel, and are found to be oxygen gas, or oxygen in an aeriform state. The same kind of air may be obtained by heating nitre in close vessels, or by distilling the black oxide or calx of manganese with sulphuric acid or oil of vitriol. This gas is absorbed by combustible bodies and converts them into acids. It is essential to the process of combustion, as it unites with bodies that burn, increases their weight, and changes their properties. It is also essential to respiration, no animal being able to live in air which is deprived of oxygen gas.

2. *Simple combustibles* are substances capable of combustion or burning: they are sulphur, phosphorus, carbon, hydrogen and azote.—*Sulphur* is a hard brittle yellow substance without smell, and almost without taste. It is found pure and in a mixed state. By combustion it may be converted into acid.

Phosphorus is never met with pure, but is commonly united to oxygen in the state of phosphoric acid, which abounds in animal, vegetable, and mineral substances. It is luminous in the dark, and takes fire spontaneously, emitting a white flame, and is converted into phosphoric acid gas. *Carbon.* If a piece of wood be put into a crucible covered with sand, and kept red hot, it will be converted into charcoal. When this substance is freed from its earthy and saline particles it is called carbon. It is susceptible of crystallization and in that state is called *diamond* which is one of the hardest substances in nature, and was for ages considered as incombustible but the contrary has been proved by repeated experiments. *Hydrogen* is so called from two Greek words signifying to *produce water*. It is also called inflammable air. Hydrogen is procured in a state of gas, or combined with caloric and light, by pouring sulphuric acid diluted with twice its weight of water upon iron filings. All combustion ceases on plunging a burning substance into this gas. Animals die in it almost instantly. It is found native in muddy waters and marshes, likewise in the bowels of animals: and is exhaled from all animals and vegetables in a state of putrefaction. It is often found in mines and coal pits where it is mixed with atmospheric air and produces in explosion the most
dreadful effects. Hydrogen
tremely light; its specific gr
that of the atmospheric air as 1

Water was formerly
simple element, but Mr. Ca
covered that it was comp
and oxygen. Their
when a mixture of the
in a close vessel is set on fire b
tric spark. In the process of
water is deposited in the inte
of the vessel; and the
by drops which run to the b
vessel. Lavoisier ascertaine
consists of 85 parts of oxygen
drogen.

Azot is a species of gas, so
two Greek words signifying
because no animals can exi
is procured by pouring
acid on muscular flesh and
of 100 Fahrenheit.

3. *Metals.* The character
metals are distinguished are
the metallic lustre; opacity,
superior specific gravity to
bodies; a capacity of
malleability and ductility,
metals some of these proper
ing. Metals are seldom found
in a pure state but generally
with oxygen, sulphur,
acids. The metallic
known are,

1. Gold.
2. Platinum.
3. Silver.
4. Mercury.
5. Copper.
6. Iron.
7. Tin.
8. Lead.
9. Nickel.
10. Zinc.
11. Bismuth.
12. Antimony.
13. Te
14. Arse
15. Cob
16. Mangan
17. Tun
18. Molyb
19. Uran
20. Titanium
21. Chromiu
22. Columbi
23. Tantalu

The first ten are malleable
four brittle and easily fused,
brittle and fused with diffic
oxygen combines with metal
nation is called an *oxide*.

1. *Gold* is the most perfect
ductile, and unchangeable of
an orange red colour; and
ble lustre. The specific g
640. It combines readily w
of metals and forms various
oxides are two, one purple
the other yellow.

2. *Platinum* is found
America among gold ores.
is white like silver but not
specific gravity is 23.000. It
gold in malleability and
cannot be melted by the
cial heat, nor can it be
oxygen.

3. *Silver* is of a fine white
rable lustre. The specific
478. It is malleable, ductile,
and so tenacious that a
tenth of an inch will support
kept melted a long time
sel, it attracts the oxygen
phere. It has two oxides,

4. *Mercury*, or quicksilver,
brilliant, and its specific grav
At the common temperature of

, in which respect
ble, but it becomes
h degree of cold
ate it may be ex-
without break-
es with most of
combinations are
e are four oxides

red colour, with
s malleable, flex-
specific gravity is
s two oxides and
metals.
ful of all the me-
markable proper-
ted by the mag-
ous and has two
en rust or brown,
other black, con-
portion of oxygen.
capable of being
with difficulty, re-
o 130 degrees of
n ore is fused in
le to flow into a
sand, and is thus
ers, cannon, and
der iron mallea-
carbon and oxy-
infused and kept
, well stirred and
s the carbon and
n of carbonic acid
beat with large
o plates by iron
is called *forged*
capable of being
or that of steel.
g in charcoal in a
yers of malleable
posing them to a
n days.
te colour, like sil-
ery brilliant. Its
It is the brightest
uctile, but at the
flexible. It has
white. Tin may
ther metals, and
.
white colour, and
y bright. Its spe-
t is the least so-
lastic, of metals.
arder by hammer-
t it is more fusible
own oxides, grey,
. It is capable of
other metals.
different parts of
re is of a white co-
Its specific gra-
e malleable than
y the magnet as
y be converted it-
en heated in an
with oxygen and
.
n found in Europe
xtracted from the
ine colour with a
composed of se-
ng to each other.
0). It is between
ic metals; but is
ity has not been
oxides, white and

grey. *Zinc* combines with most metals and some of its alloys are very useful.

11. *Bismuth* is often found native. It combines with oxygen, sulphur, iron and arsenia.

12. *Antimony* is rarely found native. It is generally combined with sulphur forming sulphuret of antimony. It is of a whitish colour and so brittle as to break easily under the hammer. The interior texture appears to be laminated. It volatilizes wholly in the fire and communicates the same property to the metals with which it is mixed. It admits of fusion, and if kept in that state it oxydates and is converted into grey oxyd of antimony. If the heat is increased, this is augmented into white oxyd of antimony known by the name of flowers of antimony. This oxyd is vitrifiable and becomes glass of antimony. It combines with phosphorus and sulphur; and dissolves in wine and acetous acid.

For the other metals see under their respective articles.

4. *Earths.* When these are examined chemically it will be found that all the various kinds which we meet with as well as the specimens contained in the cabinets of the curious, are composed of a few simple or elementary bases; that is

1. Barytes,
2. Strontian,
3. Lime,
4. Magnesia,
6. Yttria,
7. Glucina,
8. Zirconia,
9. Silica.

Every body possessing these properties is an earth: 1. Insolubility in water either totally or nearly so. 2. Little or no taste, or smell at least when combined with carbonic acid. 3. Incombustibility and incapacity when pure of being altered by fire. 4. A specific gravity not exceeding 4,9. 5. A capacity when pure, of assuming the form of a white powder.

5. *Caloric*, by this name is distinguished the cause of heat or the exquisitely elastic fluid which produces it. Where bodies become hot, or when caloric enters into them, they expand in every direction, which expansion is proportioned to the quantity of caloric. But it does not expand all bodies equally; and it is as yet unknown what are its precise laws. Specific and caloric are terms used to denote the quantity of caloric necessary to heat any body to a given temperature. These terms are therefore comparative. A close resemblance exists between caloric and electric matter.

6. *Light* is considered as a substance consisting of small particles moving in straight lines from luminous bodies with inconceivable rapidity. The effects of light upon vegetation are well known: many flowers follow the course of the sun, and plants that grow in houses make an effort to get at the light. The more plants are exposed to the light, the more colours they acquire. All metallic oxides become of a deeper colour by being exposed to the sun. Many bodies if exposed to the light combine with it, and emit it again under certain circumstances. These are called solar phosphori. Many animal and vegetable substances also possess this property, as dead fish, rotten sea-weeds, the glow-worm, and several other insects.

Of Compound Bodies.—To bodies composed of two simple substances combined together, is given the name of compound bodies of the first order. They are reduced to five classes.

1. Water,
2. Alcohol,
3. Oils,
4. Alkalies,
5. Acids.

1. *Water*, is essential to the existence of animals and vegetables. When pure, in which state it can be obtained only by distillation, it is transparent and destitute of colour, taste or smell. At a temperature below 32 of Fahrenheit it becomes solid and is called ice. When water is heated to the temperature of 212 degrees it boils, and is gradually converted into steam which is an invisible fluid like air, but of a less specific gravity. Its elasticity is so great that it is capable of bursting the vessels in which it is confined, with a violent explosion.

2. *Alcohol.* Ardent spirits as brandy and rum consist of three ingredients, water, alcohol, or spirits of wine to which they owe their strength; and a small quantity of oil to which they owe their flavour. Pure alcohol is transparent, of a pleasant strong smell and a penetrating taste. It turns to a flame and is composed of carbon, hydrogen and oxygen.

3. *Oils*, are divided into two classes, fixed and volatile. The former are obtained partly from animals and partly from vegetables, by simple expression. Volatile oils, called also essential oils, are all procured from vegetables. They have a strong aromatic smell, and a pungent acid taste, and are valued on account of their pleasant odour. Some are obtained by expression as oil of bergamot, lemons, &c. Others by distillation as oil of peppermint, thyme, &c. They appear to consist of carbon and hydrogen, but nothing is certainly known of the proportions.

4. *Alkalies*, are substances possessed of the following properties; 1. Incombustibility. 2. The power of converting vegetable blues into green. 3. A hot caustic taste. 4. A high degree of solubility in water, even when combined with carbonic acid.—There are three alkalies, potash, soda, and ammonia. The two first are called fixed alkalies, because a violent heat is necessary to volatilize them: the last is termed volatile, as it easily assumes a gaseous form and is dissipated by a moderate heat.

If a sufficient quantity of wood be burnt to ashes and these washed repeatedly with water, till it comes off free from any taste, and this liquid be filtrated and evaporated to dryness the substance remaining is potash, but combined with impurities, from which it cannot be cleared but by a more complicated process. Pure potash is so highly disposed to unite with oils, particularly fat, muscular flesh, and other animal substances that it disorganizes them rapidly.

Soda, called also mineral alkali greatly resembles potash and is obtained from the ashes of marine plants, the combination of soda or potash with oils or fat makes soap.

5. *Acids.* According to Lavoisier all acids consist of a certain base united to oxygen, which is the cause of acidity. The bases of the sulphuric, nitric, phosphoric, and arsenic acids are known, and it is [illegible] also that hydrogen, carbon, and [illegible] form the bases of the vegetable [illegible] that the same substances combined [illegible] nitrogen constitute the animal [illegible] But we are yet ignorant of the bases of [illegible] muriatic, boracic, and fluoric acids. [illegible] are either solid, liquid, or gaseous. [illegible] excite a peculiar sensation on the [illegible] called sour; and they change [illegible] blue vegetable colours, red. [illegible] unite to water in all proportions [illegible] the acids combine with the alkalies, [illegible] these combinations have been [illegible] neutral salts, which are distinguished [illegible] two names, one expressing the acid [illegible] the other the alkaline base. The [illegible] these may have two variations [illegible] nation, corresponding to two [illegible] states of the acid in the salt. The [illegible] nation *ate* is used when the acid [illegible] pletely saturated with oxygen [illegible] name ends in *ic*; thus the salts [illegible] with the *nitric* acid are called [illegible] Words terminating in *ite* distinguish [illegible] presence of those weak acids [illegible] not fully saturated with oxygen, [illegible] when alone have names ending [illegible] thus *nitrites* are salts compounded [illegible] *nitrous* acid.

All metallic substances combine [illegible] some of the acids; but the alkalies [illegible] earths enter into the composition [illegible] tral salts without a uniting medium, [illegible] the metals do not combine with acids [illegible] less they have been oxygenated: [illegible] fore the metals themselves are not [illegible] in acids but only the metallic oxydes.

The following are the acids at [illegible] known.

Mineral Acids.

Sulphurous,
Sulphuric,
Nitrous,
Nitric,
Muriatic,
Oxygenated Muriatic.
Hyper-oxy[illegible] muriatic
Carbonic,
Fluoric,
Boracic,
Mellitic.

Metallic Acids.

Arsenious,
Arsenic,
Tungstic,
Molybdic,
Chromic,
Columbic.

Vegetable Acids.

Acetic,
Malic,
Oxalic,
Citric,
Tartaric,
Benzoic,
Camphoric,
Gallic,
Succinic,
Suberic.

Animal Acids.

Phosphorous,
Phosphoric,
Sebacic,
Laccic.
Lactic,
Saccho-lactic,
Prussic.

1. *Doubly Compound Bodies.* These bodies which consist of combinations of [illegible] stances called compounds of the first order, and may be reduced to three classes. 1. Soaps. 2. Neutral Salts. 3. [illegible] ets. 1. *Soaps.* The compounds into which oils enter without decomposition [illegible] so called. They are alkaline and [illegible] 2. *Neutral salts.* The word salt has been used in chemistry in a very [illegible] and not a strict sense. Every [illegible] which is sapid, easily melted, soluble in water, and uncombustible has been [illegible]

all the proper-
mbines with water and
a red colour to vegeta-
mposes soaps and sal-
ned with alkalies, earths,
ides and forms com-

ution.—The reduction
rts by *pulverisation*, &c.
us in their being che-
. But these processes
e substances into their
es; nor do they destroy
bodies. The real che-
n the contrary, separate
articles. Brittle sub-
d to powder by means
s, and mortars, stones
gwood's ware makes
t for most purposes.
c gum, and some me-
he hammer and must
rasped, or grated. The
er parts of bodies from
by sifting or washing.
pose there are sieves
of fineness. *Washing*
powders uniformly fine,
y than can be had by
ered substance is mix-
ome other convenient
allowed to settle and
f, the coarsest powder
ttom of the vessel and
with the fluid. By re-
s various sediments
st being of course the

r kind of sifting: but
rate fluids from solids,
ing through the pores
e linen, sand, pounded
ses. Unsized paper is
king filtres for chemi-
must be wrapped up in
put into a glass funnel.
en used for the same
n, and if the sediment

which it arranges its particles in different figures. Vessels of earthen ware or glass are used for these crystallizations.

Solution.—When a salt is mixed with water it loses its solidity; the particles being divided and uniting with the water. The same takes place when resin is mixed with spirits of wine. In this process neither the salt nor the water is decomposed, and the salt may be recovered again in its original state and quantity by evaporating the water. But the dissolution of metals by acids is different, for here either the metal, the acid, or the water is altered and different products are obtained. Glass vessels are generally used for solutions and dissolutions. The liquid made use of for dissolving a metal, or other solid substance, is called a solvent or menstruum.

Precipitation.—The separation of a body from its solvent by adding a third substance, so that the former may reappear in a solid state, is termed precipitation, the substance recovered is called a precipitate, and the superadded body which occasions the precipitation a precipitant.

Fusion.—The melting of a body from a solid to a fluid state by the action of fire is called fusion. The vessels used for this purpose are chiefly made of earthenware or a mixture of clay and powder of black-lead, and are called crucibles. Sometimes they have covers, but others are broad and shallow, that the fused metal may be exposed to a current of air. These are named cupels: and are placed under a sort of oven, made of earthenware, called a muffle; which, with the included cupel is exposed to the heat of the furnace.

Furnaces.—In the application of heat to bodies furnaces of different forms are employed according to the operations intended. In general a chemical furnace is a kind of hollow cylindric tower, sometimes a little wider at the top, with notches for the admission of the air. This furnace should have two lateral apertures, an upper is to reverberate the heat and flame on the retort.

Blow-pipes are used for directing the flame of a candle or lamp against any substance that is to be examined. They ought to have a bulb upon the middle of the stem to contain the moisture formed by the breath.

CHENOLEA, in botany, a genus of the order monogynia and pentandria class of plants. Calyx globular, one-leafed, five parted; capsule one-celled with a smooth seed. There is one species which is a native of the Cape of Good Hope.

CHENOPODIUM, *goose-foot*, or *wild orach*, a genus of the digynia order and pentandria class of plants, in the natural method ranking under the 12th order, holoraceæ. Calyx pentaphyllous and pentagonal; corolla none; one seed, lenticular, superior. There are 23 species, 13 of which are natives of Britain. Most of them have an aromatic smell. There is a species growing in the Mediterranean of which kelp is made. The common English mercury or chenopodium bonus Henricus was formerly used as spinach: and is much in vogue among country people for healing ulcers and slight wounds.

CHERLERIA, a genus of the decandria trigynia class of plants. The flower has properly no petals; the nectaria are five, roundish and emarginated, very small, and placed in a circular direction. The fruit is a capsule, formed of three valves and containing three seeds. There is only one species.

CHERMES, a genus of insects belonging to the order hemiptera: of which there are 17 species. They are chiefly found on the fig tree. The larva has six feet and the chrysalis differs from it by two flat buds springing from the thorax and inclosing the wings. These chrysalids are frequently found in plants.

CHERT, in mining, is a kind of flinty stone found in thin strata in quarries of lime-stone. It is usually of a light blueish colour, but variously shaded, Kirwan calls it hornstone.

CHESS, a game performed with different pieces of wood on a board divided into 64 squares or houses, in which chance has so small a share that it is a matter of doubt whether a person ever lost but by his own fault. Each player has eight dignified pieces, namely, a king, a queen, two bishops, two knights, and two rooks, also eight pawns; all of which are of two different colours, or white and black.

CHIARO SCURO, see *Claro Obscuro.*

CHIEF, in heraldry, is that which occupies the whole upper part of the escutcheon, from side to side.

CHILIAD, a thousand articles of any things ranged in several divisions, each of which contains that number.

CHILIAGON, in geometry, a regular plane figure of 1000 sines and angles.

CHIMARRHIS, in botany, a genus of the class and order pentandria monogynia. Corolla funnel form; capsule inferior, obtuse; two celled, two-valved; seeds one in each cell. The only species is a lofty tree, which grows in Martinico.

CHIMES *of a clock*, a kind of periodical music produced at equal intervals of time
by means of a particular
to the clock.

CHIMNEY, the rules for
nies, are, 1. that no timber be
twelve inches of the fore side
ney-jambs. 2. That all the
back be laid with a trimmer
timber be laid within the
chimney.

CHIOCOCCA, a genus of the
nia order and pentandria class
belonging in the natural
48th order aggregatæ.
shaped and equal; berry
dispermous, inferior. There
cies.

CHIONANTHUS, the
fringe tree, a genus of the
der and diandria class of
tural method ranking under
sepiariæ. Corolla,
ments long; the fruit a
are four species, the most
which is the Chionanthus
is common in Virginia, and
lina, where it grows by the
and rises to the height of

CHIRONIA, a genus of the
order and pentandria class
longing to the 20th natural
Corolla, wheel-shaped,
downwards; stamina in the
corolla; antheræ in their
seed-case bilocular. There
the most remarkable of which
ronia frutescens, a native
of Good Hope. The flowers
red colour.

CHIRURGERY, an old term
as chirurgeon, is for surgeon.

CHITON, a genus of
vermes testaceæ. The shell
sisting of many parts lying
each other. There are 9

CHLORA, a genus of the
order, and octandria class of
octophyllous; corolla
octofid; capsule, unilocular,
polyspermous. There

CHLORANTHUS, in
the class and order tetrandria
Calyx none; corolla, three
by the side of the germ;
to the petal; drupe seeded.
species, a native of China.

CHLORITES, a kind of
most as pellucid as the
ralds. It is sometimes
sometimes chrystalized.
species, viz. the earthy
chlorite, the foliated and
rite.

CHOCOLATE, a sort of
chiefly from the cacao nut.
cacao is properly roasted
it is pounded in a
wards ground on a stone.
hot into tin moulds in which
geals. The Spaniards mix
nuts, cloves, cinnamon, and
dients; but in England, the
made of simple cacao, with
and vanilla. The
ready made, and cacao
ted. If made and sold in
it pays a duty of 1s. 6d. per

CHŒNIX, a dry measure
antients containing eight

sudden effu-
ilig on the sto-

of the polyga-
esia class of
rthod ranking
ate. Recepta-
ted; pappus,
ets numerous

a right line
arch of a cir-

be lines of the

trings by the
ation of sound
ons of which
e are determi-

nt poetry, a
bles, of which
and the two

t of making a
of province.
anatomy ap-
e body having
ion. See *Ana-*

ncient music,
ds into which
e subdivided.
of the science
perties of the
ial bodies are

ICAL, an ap-
of a long and

cience which
measuring its
o past transac-
of history. It
the first treats
t of time, and
the second of
ous events re-
ging them ac-
ons of time in
appened. By
y we can cal-
empires, the
dates of all re-
moter periods.
ia; which sig-
y memorable
christian era
rst. Different
rent modes of
ost ancient is
cription of the
iths of 360 days:
Egyptians rec-
er, and from
ed this method
by *olympiads*,
of four years,
h, that is in the
our of Jupiter
d with great
Olympia a city
re established
hrist 776. This
ears to have
ch ended A. D.
er mention of

The usual mode of Roman computation was from the years which had elapsed from the building of the city *anno urbis conditæ* thus expressed A. U. C. This event took place A. M. 3252, before Christ 752.

The ordinary mode of reckoning the years of the world is to take 4004 before Christ for the era of the creation which is adopted from the Scriptures. Christians compute from the era of our Saviour's birth, which happened in that year and in the 27th of the reign of Augustus and of the 749th year of Rome. The Turks compute their years from the flight of Mahomet from Mecca called the *hegira*.

The Julian or old stile is so called from Julius Cæsar who regulated the Roman Calendar. He added a day after the 24th of February called by the Romans the Calends of March; as it was thus reckoned *twice*. The year in which it was introduced was called *Bissextile* or what we term leap year.

This calendar was reformed in 1582 by Pope Gregory XIII. from whence rose the new stile adopted thoughout Europe except Russia.

The greatest difficulty in Chronology has been to accommodate the two methods of computing time by the course of the moon and that of the sun, to each other; the nearest division of the year by months being twelve and yet twelve lunar months falling short of a complete year by eleven days. This gave rise to many cycles among the antients, the most perfect of which was called the Metonic from Meton an Athenian astronomer. It consisted of 19 years in which seven months were intercalated. This brought the two methods so near to an agreement that after the expiration of the period not only do the new and full moons return on the same day of the year, but very nearly on the same hour. This cycle was adopted at the council of Nice for the purpose of settling the time for keeping Easter and other moveable feasts. This period, however, falling short of 19 years almost an hour and a half, it happens that the real new and full moons have anticipated those in the calendar of our books of common prayer four days and a half. These last therefore are called calendar new moons.

Problems in Chronology. 1. To find whether any given year be leap year.

Rule. Divide the given year by 4; if 0 remains it is leap year; but if 1, 2, 3, remain it is so many years after.

2. To find the dominical letter before 1800.

Rule. To the given year add its fourth part, omitting fractions, divide the sum by 7; the remainder taken from 7 leaves the index of the letter in the reckoning of the common year.

1	2	3	4	5	6	7
A	B	C	D	E	F	G

But in leap years this letter and its preceding one (in the retrograde order which these letters take) are the dominical letters.

The dominical letter is that which points out in the calendar the Sundays throughout the year; thence called the Sunday letter.

3. To know on what day in the week any proposed day of the month will fall,

each denotes the years of its respective cycle.

The solar cycle is a period of 28 years in which time all the varieties of the dominical letters will have happened, and the 29th year of the cycle begins again, when the same order of the letters will return. At the birth of Christ nine years had passed in this cycle.

The lunar cycle or golden number is a period of 19 years, containing all the variations of the days on which the new and full moons happen, after which time they fall on the same days again. But when a centesimal or hundredth year falls in the cycle, the new and full moon according to the new style will fall a day later than otherwise. The birth of Christ happened in the 2d year of this cycle. The Roman indiction is a cycle of 15 years, which first began the third year before Christ.

5. To find the epact till A. D. 1900.

Rule.—Multiply the golden number for the given year by 11; divide the sum by 30, and from the remainder take 11, which leaves the epact. If the remainder be less than 11 add 19 to it.

6. To find the moon's age.

Rule.—To the epact add the number and day of the month; the sum if under 30 will be the moon's age; but if it exceeds 30, the excess in months of 31 days, or the excess above 29 in a month of 30 days, is the age. The moon's age taken from 30 leaves the day of the next new moon. When the solar and lunar cycles begin together, the moon's age on the first of each month, or the monthly epacts are called the numbers of the month, thus,

Jan.	Feb.	Mar.	April	May	June
0	2	1	2	3	4
July	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**
5	6	7	8	9	10

7. To find when Easter-day will hap-

and next
as the dis
of the la
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inches the
light desc
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same size a

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CHRYSA
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several other
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days while other

CHRYSIS, or
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are 7 species of
most remarkable
ied. The form

es which is a native

natural history, a
ents gave the name
chrysolite being that
ellers call topaz
nd in angular frag-
ed. It is of a green
wo varieties, 1. the
und in Ceylon, South
. Its colour is a
Olive Chrysolite is
small, and is of an

genus of insects of
a. There are 21 spe-
n the trees on which
omela of the tansy,
&c.
M, the *bully tree*: a
a order and pentan-
n the natural method
43d order dumosæ.
natives of the West
rkable are, 1. Chry-
which grows in the
. The fruit is about
ppin and is very es-
it some time has an
Chrysophyllum gla-
half the size of the
s oval and of a deli-
cies are often pre-

mineral found in
s always amorphous
and splintery.
a genus of the digy-
ia class of plants;
ural method to the
e. Calyx quadrifid
oured; corolla none;
nilocular, and poly-
e 2 species common
ts of Europe.
nimal economy, a
om the aliments by

not so large. They are cultivated in Spain as an ingredient in olios.

CICHORIUM, *succory*, a genus of the polygamia æqualis order in the syngenesia class of plants; belonging to the 49th natural order, compositæ. There are three species, 1. Cichorium endivia the common endive which is both an annual and biennial plant and esteemed as a sallad. 2. Cichorium intibus, or wild succory, grows naturally by the side of roads and in shady lanes. It is good in scorbutic complaints. 3. Cichorium spinosum with a prickly stalk grows in Sicily and the islands of the Archipelago.

CICINDELA, the *sparkler*, in zoology, a genus of coleopterous insects, of which there are 14 species. The campestris or field sparkler is one of the most beautiful. The upper part of the body is of a bluish green colour and rough; the under side, legs and antennæ are gold and red. The eyes are prominent. The thorax is angular and narrower than the head. Both are of a green colour tinged with gold. This insect runs as well as flies with great swiftness. It is found in dry sandy places especially in the beginning of Spring. The larvæ of all this genus live under ground, and are, as well as the perfect insects, very fierce, attacking and destroying all they can.

CICUTA, *water hemlock*, a genus of the order digynia in the pentandria class of plants, ranking in the natural method under the 45th umbellatæ. There are three species, 1. Cicuta bulbifera; 2. Cicuta maculata; 3. Cicuta virosa. This last is the only one remarkable, and that for the poisonous qualities of its roots.

CIDER, a drink made of the juice of apples. In this process the Devonshire method is preferred, which is to gather all the apples that have dropped from the trees from time to time into a heap where they are suffered to lie about ten days; secondly such as are to be gathered from the trees having acquired some degree of maturicider is done by burning a match in a clean hogshead, moist from recent rinsing and racking the cider on the fret into it. If much on the fret, when the cider is half racked into the scented cask, burn another match in each cask, rolling the same well about for a couple of hours. Stum is the rich must of good cider, blended with the vapour of the burning match, which prevents its fermenting; and when disposed to fret, must be racked into another cask, well matched. Stum is used to mend declining cider, to make it ferment afresh, and give to it new life and sweetness. Boiled cider makes the best stum for keeping.

Cider wine. The method of preparing this liquor in America, where it is much used, is as follows: the fresh apple juice is evaporated in a brewing copper till half of it be wasted; the remainder is then put into a wooden cooler, and afterwards into a cask, with an addition of yeast, and so fermented in the ordinary way. This process has lately been adopted in some of our cider counties, but from the impregnation of the copper in the liquor, the public ought to be guarded against the use of it.

CILIARE, *ligamentum ciliare*, or *ciliaris processus*, in anatomy, a range of black fibres, surrounding the chrystalline humour of the eye.

CIMEX, or *bug*, a genus of hemipterous insects, of which there are above 121 species. The larvæ of bugs only differ from the perfect insect by the want of wings; they run over plants, and change to chrysalids without undergoing any material change. The cimex lectolarius, or house-bug is acceptable to spiders, and even sought after by the wood-bug. Various methods have been recommended for destroying this pernicious insect, as oil of turpentine, camphor, solutions of sublimate, &c.

CIMIFUGA, a genus of the polyandria order, in the dioecia class of plants: of which there is only one species, the cimifuga fœtida bearing yellow flowers with a red seed. It so resembles the actæa racemosa as to be distinguished from it with difficulty. It is a native of the Carpathian mountains, and has the property of driving away bugs: from which quality it has its name.

CIMOLIA *Alba*, the earth of which tobacco pipes are made. It is dense, compact, heavy, of a dull colour, and of a very

2. Cinchona caribæa, a
Indies. In Jamaica it is
side beech and grows from
height. The dark brown
been used medicinally
Cinchona officinalis, or
vian bark, grows to the
the taste of the bark is
with a considerable de
Its medical virtues are

CINCTURE, or *cincture*, in
a ring or list at the top and
shaft of a column.

CINERARIA, a genus of the
order syngenesia polygamia
Calyx simple, many-leaved
pus simple; receptacle
are 41 species most of them
plants and natives of the Cape
Hope.

CINNABAR, in natural his
native or factitious. The
of quicksilver moderately
heavy, and of a striated
cinnabar is a mixture of
phur sublimated and reduced
substance. The principal
painting when it passes
of vermilion. In medicine
mended as a sedative and
also as a mercurial fumiga
real cases.

CINNAMON, the bark of
laurus. The true sort is
cinnamomum, and the
laurus cassia. Cinnamon
in the *primæ viæ*, but in
seats of action it is an
alexipharmic. It is useful
and flatulencies. The oil of
made now in England and is
than what was formerly
Holland. Cinnamon water
distilling the bark first infused
wine or brandy.

CINQUE-FOIL, see

CIPHER, or CYPHER,
bic characters used in
also a kind of conjunctive
ing of letters interwoven;
nerally the initials of a

Cipher also denotes
racters disguised and varied
ing letters for the purpose of
properties necessary in this
ble are that the cypher be
the person for whom it is
clear of suspicion by any
whose hands the same may

he polygon, which
of each. The ra-
the peripheries of
r than that of the
perimeter of the
, but less than that
The difference of
he ratio of the dia-
is easily had in
h not exactly true.
ed the proportion

circle, or the ma-
, whose surface is
cle, is a problem
e thoughts of geo-
but is in general
ble.
er kind is an ex-
mathematicians as
curve expressed by
$m-1$ $-ax^m$; which
when *m* is an even
dd the curve will

a longer course of
rdful to recover the
o signifies the jour-
h the judges take
urns of assize. Eng-
ix circuits; Wales
d into three.
rrical numbers, are
rminate in the roots
powers end in 5
5 is 25; the square

g, in navigation,
he arch of a great

stronomy, signifies
lanet or revolving
d by the arch of a

ical instrument con-
which being heated

CIRCUMSCRIBED HYPERBOLA, is one of the second order according to Newton, and cuts its asymptotes containing the parts cut off within its own space.

CIRCUMSCRIBING, in geometry, denotes the describing of a polygonous figure about a circle so that all its sides may be tangents to the circumference. The term is also used for the describing a circle about a polygon so that each side is a chord; but it is more correct to say that the polygon is inscribed than that the circle is circumscribed.

CIRCUMSCISSA CAPSULA, in botanical language is a capsule cut transversely.

CIRCUMVALLATION, in military affairs, is a fortification of earth consisting of a parapet and trench made round a town intended to be besieged when opposed to any army that may come to its relief.

CIRRI, in botanical language denotes the fine strings or filament by which creeping plants adhere to walls and trees. In ichthyology the term is applied to appendages hanging from the mouths of fishes and called by some beards

CIRRHIFERUS PEDUNCULUS, among botanists is a peduncle, bearing a tendril.

CIRRHOSUM FOLIUM, a leaf terminating in a tendril.

CIRRHUS in botany, a clasp or tendril, the fine string or fibre by which some plants fasten themselves to walls, trees, &c.

CISSAMPELOS, a genus of the monadelphia order in the dioecia class of plants and in the natural method ranking under the 11th order, sarmentaceae. There are five species of which the principal is the Cissampelos caapeba a native of America. The root is applied externally as a remedy against the bite of serpents. The plant being infused in water fills it with a juice as thick as jelly, whence it has the name of freezing wyth.

CISSOID, in geometry, a curve of the second order first invented by Diocles and evergreen shrubs, and very ornamental in gardens. The flowers are white, purple, and yellow. They are propagated by seeds or cuttings. Gum labdanum is obtained from one of the species in the Levant.

CITADEL, a place fortified with four, five, or six bastions, on a convenient hill near a city which it commands.

CITATION, in ecclesiastical courts is the same with a summons in the civil.

CITHAREXYLUM, *fiddle wood*, a genus of the angiospermia order in the didynamia class of plants, ranking in the natural method under the 40th order, personatæ. There are five species natives of America where they grow to a considerable height; but here they are mere shrubs. The flowers are white.

CITRINUS, in natural history, a species of sprig chrystal of a beautiful yellow colour. The pyramid is always finer than the column.

CITRUS, the citron, orange, and lemon tree, a genus of the polyadelphia class, and icosandria order of plants. Calyx quinquefid; petals oblong, and five; antheræ twenty, filaments united into various bodies; fruit nine-celled. There are five species, and many varieties. 1. Citrus aurantium, the orange, of which the varieties are, the Seville orange, a handsome tree and the hardiest of any. The fruit is large, rough rinded, and sour. 2. The China orange, which has a smooth, thin-rind, and sweet fruit. 3. The forbidden fruit tree, very much resembles the common orange tree, but the fruit is large. The flavour is delicious. 4. The horned orange is a tree of moderate size, producing fruit which divide, and the rind has divisions like horns. 5. The hermaphrodite orange produces fruit formed partly like that of the orange, and partly like a citron. 6. The dwarf orange tree or nutmeg orange, grows to the height of two or three feet, and the fruit is very small. 11. Citrus medicæ, the citron tree, of which there are six varieties. The lemon tree is accounted a variety of the citron, and of this there are not less than eleven sorts. Besides these varieties of the citrus there are several others, as, 1. The citrus trifoliata a thorny shrub, which grows in Japan. 2. Citrus decumana or shaddock, which is a native of the East and West Indies. 3. Citrus Japonica, the fruit of which is about the size of a cherry and very pleasant to the taste.

CIVET, a perfume so called from the animal whence it is taken. See *Viverra*.

CIVIL LAW, is properly the peculiar law of a state, country, or city: but is now applied exclusively to a body of laws compiled out of the best Roman and Grecian systems of jurisprudence, agreeable to what is donominated the law of nature and nations, and which were generally observed throughout the Roman dominions above 1200 years. In our country the civil law is used in the Ecclesiastical courts and the admiralty, but is subservient to the common law.

CIVIL YEAR, is the annual account of time appointed by every government to be used within its own dominions; and so called in opposition to the natural year.

CIVILIAN, a term applied to the doctors and professors of the ci
London they have a colleg
tor's Commons.

CLAMP, *in a ship*, a piec
tened to a mast or yard to pr
splitting; also a plank, ly
aft under the second deck. O
wise a term for a pile of

CLAMPING, in joiner's w
fitting a piece of board with t
another board cross the grain,
its warping.

CLARENCIEUX, the se
arms, so called from Lionel
rence to whom the title orig
tained. His office is to mar
of procession in the funeral
rior nobility, &c.

CLARIFICATION, in ch
clearing and fining any fluid
rogeneous matter.

CLARO OBSCURO, in p
art of distributing advanta
light and shadow of a piece
to the ease of the eye and the
whole. It also denotes a dr
ing of only two colours usually
white or black and yellow.

CLASMIUM, the name of
fossils of the class of gypsum
a dull appearance. It affords
plaster of Paris.

CLASS, a term given to the
visions of a subject: thus in t
system, animals and plants
into classes.

CLATHRUS, in botany, a ge
ish fungi; the substance of w
holes, like the mashes of a
are 7 species.

CLAVA, a genus of verm
having one common aperture
vertical and surrounded by
tentacula. There is only on

CLAVARIA, *club top*, a g
cryptogamia class of plants
order of fungi; and in the na
ral method. According to
whole genus of clavaria
reckoned in the tribe of zoo
therefore he classes them
vermes. Other naturalists
have not been able to discern
of an animal nature in the
species are; 1. Clavaria
the oak leather club-top rese
ned leather. 2. Clavaria mili

CLAVICHORD, an old mu
ment of the nature of the spin

CLAVATUS *petiolus*, in bo
stalk with the leaf or flower
tapering from the base to the a

CLAVICLA, a little tendril

CLAW, in the language of
notes the sharp pointed nails
the toes of quadrupeds and bi

CLAUSA *corolla*, in botany
with its neck close shut in wi

CLAY, a kind of earth whi
merly denominated argillace
now found to be a mixture
and silica in various propo
also contains carbonat of lime,
sia, barytes, oxyde of iron &c.
slightly to the tongue, feels
falls to powder in water. W
is white with a tinge of blu
Potters clay stains the fingers a

nbbing. When properly
s very ductile. Tobacco
rariety of this species. The
uanose clay is slaty, and of
It is usually found in coal

, a genus of the pentandria
ass of plants. The flower
ovate oblong erect petals,
a round unilocular cap-
g three seeds. There are

ship, is a piece of wood
rd-arm and other parts, to
s on.
heraldry, a cross charged
f the same figure, and of
he field.
IFF, in music, a mark set
ng of a song, denoting the
e same is to be performed,
marked on a line to ex-

virgin's bower, a genus of
polygamia class of plants,
which consists of four ob-
als. There is no pericar-
mall receptacle contains
lish flat seeds, crowned
y filament. There are 21
climbing shrubs.
genus of the siliquosa or-
radynamia class of plants,
natural method under the
staminex. There are 15
t two of which are natives
tes. They are herbaceous,
s are of various colours.
, a water clock, or instru-
uring time by the fall of a
y of water. The antients
ids of these instruments,
em the water ran through
ge, from one vessel to ano-
is last was a bit of cork, or
ich rose by degrees as the
nd shewed the hour.
word originally applied to
from the Greek κληρος
it was afterwards used to
of learning. In our law
esignation of every person
under the episcopal dig-
rd clerk is now variously
ions in numerous offices in
e government, as well as
yed in keeping merchant's

DRUM, a genus of the
giospermia class of plants,
e are eight species, all na-
t Indies.
a genus of the monogynia
decandria class of plants,
ral method ranking under
r, bicornes. There are four
ost remarkable of which is
initolia, a native of Vir-
dina. It grows there to the
eet, and is a beautiful flow-
thi country. It is propa-
s, but they are two years
ke root.
lower corner of a sail to
ts and tacks are made fast,
ls have no clews.—*Clew-gar-*
astened to the clew of the sail, and serves to haul it up to the middle of the yard.—*Clew-line* is the same to the topsails, topgallant sails and spiritsails as the former is to the main and foresails.

CLIBADIUM, a genus of the monoecia pentandria class and order of plants; of which there is only one species a native of Surinam.

CLIFFORTIA, a genus of the polyandria order in the dioecia class of plants; ranking in the natural method under the 38th order tricoccæ. There are 19 species, all natives of Africa, and in this country they are green-house plants, and ornamental ever-greens.

CLIMACTERIC, among the old physicians denoted a critical period in a person's life, in which he was supposed to be in particular danger of death. According to some, every seventh year is a climacteric and the grand climacteric is the 63d year. This superstitious notion is now obsolete.

CLIMATES, in geography, are certain spaces upon the globe, contained between two parallels, and so far distant from each other, that the longest day in the parallel differs half an hour from the longest day in the other.

CLIMAX, in rhetoric, is a figure wherein the word or expression, which ends the first member of a period, begins the second and so on; so that each member makes a distinct sentence.

CLINCH, on board ship, is that part of the cable which is bent about the ring of the anchor, and then made fast.

CLINCHING, in sea language, is the driving a little oakum into the seams to keep out the water.

CLINICAL, in medicine, is applied to the practice of visiting and treating patients.

CLINOPODIUM, *field basil*, a genus of the gymnospermia order in the didynamia class of plants; in the natural method ranking under the 41st order, asperifolia. There are five species all herbaceous plants, in smell between the marjoram and basil.

CLIO, a genus of insects belonging to the vermes mollusca. The body which is fitted for swimming, has two membranaceous wings opposite each other. There are three species.

CLITORIA, a genus of the decandria order in the diadelphia class of plants; and in the natural method ranking under the 32d order papilionaceæ. There are five species all herbaceous perennials or annuals of the kidney-bean kind and natives of both the Indies. The flowers are large and of a deep blue colour; but some are white. An eye-water is distilled from the fruit.

CLOCK, a machine for measuring and announcing of time. The invention of clocks with wheels, is ascribed to Pacificus archdeacon of Verona in the ninth century; but others attribute the invention to Boethius about A. D. 510. The invention of pendulum clocks is disputed between Galileo and Huygens, but the weight of evidence is on the side of the latter, who put it in practice in 1657. The first pendulum clock *made in England* was by a dutchman *named Fromantil* in 1662. Before the pendulum was adopted, a balance was used resembling the fly of a jack.

Clock work, properly so called, is that part of the movement which strikes the hours, &c. on a bell. The wheels composing the clock part, are the great or first wheel which is moved by the weight or spring: in 16 or 30 hour clocks this is called the pin-wheel; but in eight day clocks the second is commonly the pin wheel or striking wheel, and is moved by the former. Next to the striking wheel is the detent or hoop wheel having a hoop almost round it, in which is a vacancy at which the clock strikes. The next is the third or fourth wheel according to its distance from the first called the warning wheel. To these is added the pinion of report which drives round the locking or count wheel, having commonly eleven notches unequally distant to make the clock strike the hours. Besides the wheels to the clock part belong the ratch, a kind of wheel with twelve large fangs running concentrical to the dial wheel, and serving to lift up the detents every hour and make the clock strike; the detents or stops which being lifted up and let fall, lock and unlock the clock in striking; the hammer which strikes the bell; the hammer tails by which the striking pins draw back the hammer; latches whereby the work is lifted up and unlocked and lifting pieces which lift up and unlock the detent. The rules for calculating the numbers of a piece of clock-work, are these: 1. Regard need only be had to the count, striking, and detent wheels, which move round in this proportion: the count wheel commonly once in 12 or 24 hours: the detent wheel moves round every stroke the clock strikes or sometimes once in two strokes; therefore it follows that 2. As many pins as are in the wheel, so many turns has the detent wheel in one turn of the pin wheel; or the quotients of that wheel divided by the pinion of the detent wheel. But if the detent wheel move but once round in two strokes of the clock then the quotient is half the number of pins. 3. As many turns of the pin wheel as are required to perform the strokes of 12 hours (which are 78) so many turns must the pinion of report have to turn round the count wheel once: or thus the quotient of 78 divided by the number of striking pins, shall be the quotient for the pinion of report, and the count wheel, in case the pinion of report be fixed to the arbor of the pin wheel.

Ex.—The locking wheel being 48, the pinion of report 8, the pin wheel 78, the striking pins are 13, and so of the rest.

8) 48 (6
6) 78 (13
6) 60 (10
6) 48 (8

Note also that 78 divided by 13 gives 6, the quotient of the pinion of report. It is of no consequence what numbers the warning wheel and fly wheel have, their use being only to restrain the rapid motion of the other wheels.

Table and rules for regula

D.	H.	M.	S.	D.	H.
1	0	3	56	16	1
2	0	7	52	17	1
3	0	11	48	18	1
4	0	15	44	19	1
5	0	19	39	20	1
6	0	23	35	21	1
7	0	27	31	22	1
8	0	31	27	23	1
9	0	35	23	24	1
10	0	39	19	25	1
11	0	43	15	26	1
12	0	47	11	27	1
13	0	51	7	28	1
14	0	55	3	29	1
15	0	58	58	30	1

The stars make 366 revol
any point of the compass t
point in 365days and one min
they gain the365th of a revolu
hours of mean solar time, ne
regulating any clock or wat
celeration is at the rate of 3' 5
in 24 hours; or in the neares
bers, 3' 56'' by which qua
every star comes round soon
the day before. Therefore
the precise moment shewn b
watch when any star disapp
hind an object as seen throu
thin plate of metal, fixed
shutter, and do this several
cessively, if at the end of
star disappears, as much soo
the first night, by the clock
the time denoted in the table
days, the clock goes true oth
the difference between the
star be less than the table
goes too fast, if greater, it g
and must be regulated
letting down the ball of th
by little and little, till it
qual time. Thus suppo
should disappear any ni
o'clock and that on the 20th
star should disappear whe
41 '2 2'' past 10 by the clock
subtracted from 12 hours
18' 38'' for the the time sta
than the clock. Look in the ta
20 you will find the accelera
to be 1 h. 18' 38'' agreeing w
to be the difference betwee
the clock.

CLOFT, the vessel or ba
article of sale is put for th
of carriage.

CLOSE, in heraldry is
drawn with its wings close

CLOTH, in commerce, i
made of wool wove in th
term is also generally ap
made of flax, &c. but it
ly denotes the web of wo
interwoven, some of whi
warp are extended in leng
of the piece to the other;
the woof disposed across
breadth of the piece.

CLOUD, a collection
pended in the atmospher
ties chiefly of watery parti
from the sea and land by
subterraneous heat, and pe

air near the earth, on
ier and a colder region
se clouds are form d.
een uniformly mix l
the atmosphere, and
ed with it to a great
tance; in which case
r or is collected into
ower subsidence; or
conductor to the elec-
mum of the latter be
ery case the caloric
e decomposed vapour
nto the atmosphere.
mes warmer just be-
e contrary, the evapo-
suspended in the air,
ch as to become sen-
gs in its comparative

e *Carophyllus*.
ee l in weighing, as a
even pounds, and in
make a clove of cheese

ifolium.
ough, in trade, is an
ounds in every hun-
turn of the scale.
ring, a genus of fishes
der of abdominales;
eleven species 1.
r herring has no spots,
is longer than the up-
liately on being taken
Herrings are found
rthern latitudes as low
oast of France; and
ith abundantly on the
far as Carolina. The
of the herring is within
om whence a great

pickled herrings, and they give a premium for the first buss which arrives.

2. Clupea sprattus, or sprat, has thirteen rays in the back fin: it is a native of the European seas, and resembles the herring while small. The season for them is from November to March.

3. Clupea encrasicolus, or anchovy, has the upper jaw longer than the under one; it is about three inches in length; and is caught in the Mediterranean near Leghorn.

4. Clupea alosa, or the shad, has a forked snout and black spots on the sides. It is found in the greatest abundance and perfection in the river Severn in April and May, and continues till July and August. The Thames shad is a coarse and insipid fish, and does not frequent that river till the end of May or beginning of June. There is a variety of this fish near Gloucester called the twaite, which weighs about 2lb. or less.

The other species of the clupea are natives of the Indian seas, and the coast of Surinam.

CLUSIA, the *balsam tree*, a genus of the polygamia monoecia class of plants, in the natural method ranking under the order accounted dubious. There are six species, all natives of America. The most remarkable is the clusia flava, which grows to the height of twenty feet, and from every part exudes a kind of turpentine called in the West Indies *hog gum*, because it is said that when wild hogs are wounded, they rub themselves against these trees, the turpentine of which heals them.

CLUYTIA, a genus of the gynandria order in the dioecia class of plants, ranking in the natural method under the

CNEORUM, *widow wail*, a genus of the monogynia order, in the triandria class of plants, ranking in the natural method under the 38th order, tricoccæ. There is only one species which is a small evergreen and very ornamental shrub with simple leaves and yellow flowers. It is propagated from seeds.

CNICUS, *blessed thistle*, a genus of the polygamia æqualis order, in the syngenesia class of plants, in the natural method ranking under the 49th order compositæ. There are nine species, of which the only one remarkable is that called carduus benedictus. It is an annual plant and flowers in June and July. The leaves are bitter, and a strong decoction from this plant produces vomiting. It is now little used in medicine.

COAGULATION, in chemistry, the rendering a fluid body in some degree solid by exposure to cold or by the addition of something by which it is decomposed.

COAK, fossil coal prepared in the same way as charcoal, it is used where intense heat is required, for chemical purposes smelting ore, and drying malt.

COAL, a solid inflammable substance commonly used for fuel. There are various species. 1. *Pit coal*, is a black, compact, brittle mass which according to Kirwan consists of petrol or asphaltum mixed with argillaceous earth; seldom calcareous; and frequently also with pyrites. 2. *Culm coal*; this has a greater portion of argillaceous earth and vitriolic acid with a moderate portion of petrol. It burns with a flame without being consumed. 3. *Slate coal*, contains so much earth, that it looks like common slate; but burns with a flame. There are large quarries of it at Purbeck in Dorsetshire. 4. *Cannel coal*, or ampelites, is of a dull black colour, and burns with a bright flame, but is apt to fly to pieces in the fire. This kind is used for making various toys which appear like jet. 5. *Kilkenny coal*, is the lightest of all and contains the largest quantity of asphaltum; burns with less smoke and flame and more intensely though more slowly than cannel coal. 6. *Sulphurous coal*, has a considerable portion of pyrites, whence it is apt to moulder and break when exposed to the air after which water will act upon it. There are in it yellow spots resembling metal. 7. *Bovey coal*, is of a dark brown colour and of a yellow laminar texture. The laminæ are flexible when first dug but harden when exposed to the air. It consists of wood penetrated with petrol or bitumen, and frequently contains pyrites, alum, &c. 8. *Jet*. This substance is found in France, Spain, Germany, Britain, and other countries. It is found in detached kidney-formed masses of various sizes, and is of a very deep glossy black colour, opaque and hard.

COAL, *Small*, a sort of charcoal prepared from the spray and brush wood stripped off from the branches of coppice wood sometimes formed in bavins for that purpose and sometimes charred without binding. It is used by artificers to temper and anneal their works.

COAMINGS, on board a ship, are the

planks which raise up the
than the rest of the deck.
COARCTATI RAMI, in bo
guage, are branches close toge
COASTING, is the sailing
of or near land.
COAT *of arms*, in heraldry,
worn by the antient knights
armour, reaching as low as
The term is used for the bear
son or family.
COATING, among chemists,
plication of clay or some
about a glass vessel, to keep it
ing by the violence of the fire.
COATZONTECOXOCH
with the viper's head, a Mexican
great beauty. The flower is
five petals, purple within,
dle, and the rest red stained
and white spots.
COBALT, one of the semi-
most common ore of cobalt
black or vitreous ore. It is
loose powdery form, resem
bling lamp black, but a
grey colour. It is frequently
bodied in stones of
lour; and sometimes in
earths of a blue or green
mineralized by the arsenic
either loose and pure, or
sum, or indurated and
also found in a stalactical form
invests other cobaltic ores.
ralized by sulphurated iron
sembles in colour tin or
mineralized by sulphur,
it resembles the harder kinds
balt ore, but is not harde
fire. The great consumption
for the permanent blue
glasses, enamels, metals, and
earthenware. Ores of cobalt
in various parts of Europe,
pally in Saxony.
COBITIS, the *loache*, a genus
of the order of abdominales,
are five species, natives of
Europe. The loache general
the bottom on the gravel,
called the groundling.
COCCINELLA, a genus of
order of coleoptera. The
sit their eggs which turn to
great enemies to the plant
most curious of the different
white hedgehog, so called fr
and being covered with
After a fortnight it turns to a
in three weeks more becomes
The eggs are oblong and of a
lour.
COCCOLOBO, a genus of
order in the octandria cla
ranking in the natural meth
12th order holoraceæ. There
cies; the most remarkable
uvifera or sea-side grape.
the sandy shores of most of
islands and sends out several
eight or ten feet high,
large leaves.
COCCULUS INDICUS,
berry too frequently mixed
quors to make them intoxica
fruit of the menisperm

genus of insects belonging
hemipeera. The female has
those of the male are erect.
species, the most remarkable
1. Coccus hesperidum or
bug, which is oval and of a
covered with a kind of var-
its legs and infests orange
et plants in green-houses.
arides, the male of this spe-
and its antennæ are long.
pink colour sprinkled with
er. Its wings are white.
gins a white cottony sub-
e stalks of the dog-grass,
posits her eggs. 3. Coccus
e of the warmer parts of
s the famous cochineal ani-
le which alone is valuable
is slothful and ill-shaped.
nce and sufficient for three
es. It is small, slender, and
ochineal insect resembles
n the manner of depositing
insects destined for this
en and put into a box lined
oth, where they lay their
he. The box is kept close
e of placing the egg on the
ctus cochenilifer or Indian
the Spaniards nopal. At
ico the cochineal insects
large quantities, and the
hem is the employment of
trade there are four sorts
stuque, campeschane, te-
ylvester. The first is the
t the worst. The cochi-
d in medicine as a cordial,
ebrifuge; but it is chiefly
and painters. 4. Coccus
rming the kermes grains,
ercus coccifera of the south-
rope, and adheres closely
of the tree, appearing like
r grain. In a good season
two thousand eggs, after
The poor people in France
raw that they may more
kermes off the trees. 5.
gum lac animal, is a na-
Indies. This species fix
n the succulent extremi-
ng branches of the trees
nd are as it were glued
d liquid, which gradually
rms a complete cell, and
gum lac. Out of this pro-
nsects, leaving the exuviæ
s that white membranous
d in the cells of the stick
lac brought to this coun-
y found on the mountains
the Ganges, and is of a
r. 6. Coccus Polonicus,
ain of Poland. It is usu-
ar the root of the plant
m coccicerum.
coccygisor, in anatomy, a
the extremity of the os

, see *Coccus*.
n anatomy, the third part
of the ear.
A, *scurvy grass*, a genus
rder, in the tedradynamia
, in the natural method
the 39th order *siliquosa*.

There are eight species, the most remarkable of which are, 1. Cochlearia Anglica, or garden scurvy grass, grows naturally on the sea shore in the north of England and Holland, but is cultivated for use in the gardens near London. It has a fibrous root, and the stalk rises from six inches to a foot in height. The flowers are produced in clusters at the end of the branches, and consist of four small white petals. Scurvy grass is a pungent medicine, and particularly recommended in scorbutic complaints. 2. Cochlearia armoracia or horse radish, is propagated by cuttings from the old roots. It is serviceable in the scurvy and other chronic disorders; and Sydenham recommends it in dropsies.

COCHLEATUM LEGUMEN, in botany, a pod like the shell of a snail.

COCHLITES, in natural history, an appellation given to the petrified shells of snails.

COCK, see *Phasianus*.

COCK'S-COMB, see *Celosia*.

COCOS, in botany, a genus belonging to the natural order of palmæ, and of the monoecia hexandria class. There are five species. The principal is, cocos nucifera or cocoa nut tree. It frequently grows to the height of sixty feet, and is smaller in the middle than at top and bottom. Owing to the load of nuts which it bears, it leans to one side. The colour is of a pale brown, and the bark smooth. The leaves are often fourteen or fifteen feet long, and about twenty-eight in number. The nuts hang at the top of the trunk in clusters of a dozen each. The nut has next the stem, three holes closely stopped. When the kernel begins to grow it incrusts the inside with a substance like jelly; this hardens and increases till it becomes white. The quantity of liquor in a full grown nut is about a pint, and is pleasant to the taste. The husky teguments of the nut consists of tough, stringy, filaments, like coarse oakum. The leaves are made into brooms, mats, sacks, and other useful articles.

COCTION, a general term for the alterations made in bodies by the application of heat.

COD, see *Gadus*.

CODE, a collection of the laws and constitutions of the Roman emperors, made by order of Justinian.

CODEX, a book or tablet, used by the antients.

CODICIL, a writing, added by way of supplement when a thing has been omitted, that the testator wishes to appear in his last will.

CŒCUM, a small gut in the human body, situated at the beginning of the colon.

COEFFICIENTS, in algebra, are the numbers or given quantities put before letters or unknown quantities, into which they are supposed to be multiplied, thus in $3a$, of bx, or cxx, 3 is the coefficient of a, b of x, and c of xx. *Coefficient* of any generating term in fluxions is the quantity arising from the division of that term by the generated quantity.

CŒLIAC ARTERY, in anatomy, that which proceeds from the aorta, just below *the diaphragm*.

[illegible] regular, decreasing towards each end; the borders are waved, and the surface is of a lucid green. The flowers, which are white, are produced in clusters at the root of the leaves, sitting close to the branches. The fruit resembles a cherry. It grows in clusters along the branches, under the axillæ of the leaves. It is at first of a green colour, and when of a deep red is gathered for use. The coffee-tree is cultivated in Arabia, Persia, the East Indies, and America. It is also raised in botanic gardens, in several parts of Europe.

Coffee is said to assist digestion, and is good in relieving the head ache. It is taken in large quantities by the Turks and Arabs.

COFFER, in architecture, a square depressure or sinking in each interval between the modillions of the Corinthian cornice, commonly filled up with a rose or pomegranate.

COFFER, in fortification, is a hollow lodgment across a dry moat, on which are raised pieces of timber, and hurdles filled with earth, serving as a parapet with embrasures. The use is for the besieged to defend the ditch, and to repulse the besiegers.

COGNATION, in civil law, a term for that line of consanguinity between males and females, both descended from one father.

COGNISOR, in law, one that passeth or acknowledgeth a fine of lands or tenements to another.

[illegible] to prevent space.

COIN, in architec diagonal-wise in the of a staircase intend in a level, and to c an entablature sup word is also used f posed of two sur each other, whether

COINAGE, or C making money. F by the hammer. H planchets or pieces them conformable to gravers prepared a in form of dyes cut that surface. On the hollow of a head or of these was to rem other moveable, th square prism, that into the hole of the dye steady. The pl this to receive the s that of the upper dy covered on the other having its engraved planchet, had at its large surface, on wh heavy blows with a

This art, however more expeditious an &c. The three fi minters use are the the machine for ma on the edges of

ining engine or
one man may
a day. To this
es or dyes are
ice under in a
ith made and [illegible]
steady, and the
ox, with similar
s laid flat on the
hen they pull the
es the screw set
done with such
ceives the im-
at a single pull.
s stamped and
mint-as it has to
goes into the scu-
dal is by a se-
piece strong get
to heighten the
leaning the piece
o the machine,
e [illegible] s
times.
ras, is the weight
es with the kings
ons.
may, a genus of
[illegible] a class of
ural method un-
on. There are
ut of which is the
e East Indies,
d Portugal
ince, the little
ussian and Dane
the natural and

o *saffron*, a ge-
a the hexandria
the natural me-
spathaceae. There

merely denotes only the absence of the usual quantity of caloric. But there have been philosophers who held that cold is a positive thing endowed with specific qualities. This notion, however, is now very generally exploded.

COLDENIA, a genus of the tetragynia order, in the tetrandria class of plants, ranking in the natural method among those called dubiae. There is only one species, which is a native of India. It is an annual plant, and the branches trail on the ground. The flowers are blue.

COLEOPTERA, the beetle tribe of insects, comprehending all those with four wings, the external pair of which are hard, thick, and opake, forming a kind of covering for the inner. There are 56 genera of this order.

COLIC, a severe pain in the lower venter, so called because the disorder was thought formerly to be in the colon. There are different kinds, as the windy colic, the bilious, the hysteric, the nervous, and the Devonshire colic.

COLLAR, an ornament consisting of a chain of gold, with devices and cyphers worn by the knights of the different orders. *Collar of a ship* is a rope fastened about the beak head into which the dead-man's eye is seized that holds the main-stay: also the rope wound about the head of the mainmast.

COLLAR *beam*, in architecture, a beam framed across between the two principal rafters. *Collar of a plough*, is an iron ring fixed on the middle of the beam.

COLLATERAL, those relations which proceed from the same stock, but not in the same ascending or descending line.

COLLATERAL *point*, in cosmography, is one of the intermediate points between mind with different sensations.

COLOUR, in painting, is applied to the substances used, and to the tints produced by them. The principal colours used by painters are: red and white lead; yellow and red ochres, amber, orpiment, lamp black, burnt ivory, vermilion, gamboge, lac, blue and green ashes, verdigris, bistre, bice, smalt, carmine and ultramarine Of these some are ground with oil, some with gum water, and others used only in fresco. Painters reduce all their colours under the two classes of dark and light: the former comprehending black, and those which are obscure and earthy; the latter white, and those which approach nearest to it.

COLOURS, in heraldry, are red, blue, black, green, and purple, thus distinguished: gules, azure, sable, vert, and purpure; yellow and white called or, and argent are metals.

COLOUR, in law, a probable plea, false in itself, and calculated to draw the case from the jury to the judge.

COLOURING, in painting, the art of disposing the tints so as to produce either an imitation of the natural colours of the objects represented, or of force and brightness of effect.

COLUBER, a genus of serpents whose genuine character is, scuta, or undivided lamella beneath the abdomen, broad alternate scales under the tail There are 97 species the principal of which are: 1. Coluber Berus, or the viper, whose general length is about 15 to 24 inches, though some have been found near three feet; the fangs, which are usually two, are placed on each side the fore part of the upper jaw. The remedy for the bite of the viper, is olive oil, thoroughly rubbed on the wounded part, and about a wine glass full taken internally. The viper is

large. The upper part
of a dusky chesnut colour, a
are marked with white speck
body being beautifully m
transverse rows of red spots.
tive of Arabia. 7. Coluber
ringed snake, is common in
frequenting woods, moist hedge
places. The general colour
grey, or pale olive on the
marked along the sides by
It is inoffensive, and feeds on
insects, worms, &c. It depo
in any warm and moist
form of a chain to the numbe
fourteen, sixteen, or more.
ber atrovirens or French snake
less animal and nearly resembl
ceding. 9. Coluber constric
snake is nearly six feet long a
of a shining black. It is very
killing rats which it will follow
of houses. It is a native of N
ca. 10. Coluber austriacus or
is found in France and several
of Europe and is very fierce,
bite is harmless. 11. Coluber
or bugle snake is a beautiful
sixteen inches long; the colou
per parts is blue, with three
from head to tail; the two la
white, and the middle one b
row of small white specks
string of beads. 12. The Col
rizans, or long-snouted snake,
colour with a yellow line on
abdomen. It is about three
about half an inch in diame
native of North America and
sects. 13. Coluber alternalis,
snake, is in general of a blue
appearance accompanied by
hues. The length is about th
a half and about three quarters

Carolina in such
to break down
hey breed in rocks
the northward of
pece. 4. Columba
geon, and it is no-
e their origin from
are still found in
nd in their native
mesticated by the
rs of the common
of a bluish ash-
t all age of change-
In the wild state
s and hollows of
nt name call it co-
istinguish it from
ds of these birds
England, and are
. They visit Bri-
quit it in spring.
from the domestic
d their names are
carriers, jacobines,
s, turbits, owls,
palumbus, the ring
a native of Europe
st pigeon we have.
ash-colour. This
in the boughs of
passerina, or the
a is about the size
colour is purple.
flocks frequently
7. Columba tur-
rdy of a yellow co-
h-coloured mixed
On each side of
ex feathers tipped
of a light purplish
each feather yel-
These birds are
ate to other coun-

cture, a round pil-
adorn a building
shaft, and capital.
tary art, a long and
ggage.
otanical language,
e substance that
le connecting the

of the angiosper-
nia class of plants
ethod under the
here are six spe-
nd West Indies.
botany, denotes

ny and geography,
d to intersect each
the poles of the
ugh the solstitial
f the ecliptic.
enna; a genus of
the diadelphia
g in the natural
order, papiliona-
ecies, deciduous
d with many-lobed
ped flowers of a
r. They are pro-
ens.
r, in ornithology, a
ch there are seve-
markable are, 1.
illemot in length

fourteen inches and in breadth twenty-two; the bill straight, and on each wing is a large spot of white. The grylle always keeps at sea except in breeding time. It is found in the western isles of Scotland on the coast of Northumberland and Wales. 2. The troile or foolish guillemot is 17 inches long; the bill straight and sharp; the body of a mouse colour. It is found in most of the northern parts of Europe. 3. The septentrionalis or red-throated diver weighs 3lbs. and is two feet long. It breeds in the north of Scotland. 4. The glacialis or northern diver, is three feet five inches long, and four feet eight inches in breadth. This species inhabits several parts of the north of Europe but is seldom seen on the land. The Greenlanders use the skin for cloathing. 5. The immer or ember goose, is a very large bird, of a dusky colour, the breast and belly a silvery white. This species frequents the Orkney islands, and is found in various parts of Europe, particularly on the lake of Constance in Switzerland. 6. The Chinese diver, is a bird used in that country to catch fish, for which purpose it has a ring placed round the neck to prevent its swallowing what is caught. 7. The cristatus or crested diver or car goose, weighs two pounds and a half. The cheeks and throat are surrounded with a ruff of a tawny colour, edged with black; the breast and belly are white; the outside of the legs dusky; and the inside green. In the fens of Lincolnshire these birds are called gaunts. 8. The urinator or tippet grebe is rather less than the preceding, and without a crest and ruff. In other respects it resembles that species. It is common in the lake of Geneva, but is scarce in England. 9. The horned grebe is about the size of a teal and inhabits Hudson's bay. On account of its quickness in diving it is called the water witch.

COMA, a preternatural propensity to sleep, which however the patient cannot enjoy, but wakes again immediately.

COMA, in botanical language, means a bush.

COMA BERENICES, or Berenice's hair, a constellation of the Northern hemisphere composed of stars near the Lion's tail.

COMARUM, *marsh cinquefoil*, a genus of the polygynia order in the icosandria class of plants, ranking in the natural method under the 34th order senticosæ. There is but one species which is a native of Britain. It grows to the height of two feet and the fruit resembles the strawberry.

COMB, an instrument for disentangling flax, wool, hair, &c. Combs are generally made of the horns of bullocks, or of elephant's and seahorse's teeth, tortoise shell, and of box or holly wood. Bullocks horns are prepared by sawing off the tips, then holding the horn in the flame of a wood fire till they become soft. In this state they slit open on one side and are pressed in a machine; then plunged into water from whence they come out hard and flat. They are next sawn into proper lengths, and to cut the teeth each piece is fixed in a tool called a clam. The teeth are cut with a fine saw or rather a pair of saws, and they are finished with a file. The process for making ivory combs is nearly the same as the above. A method has been recently invented for cutting combs by machinery.

COMBATANT, in heraldry, a term for two beasts borne in a fighting posture.

COMBINATION, in chemistry, the union of bodies of different natures thereby producing a new compound body.

COMBINATIONS, in mathematics, denote the alterations or variations of quantities, letters, sounds, or the like in all possible ways.—*Of the doctrine of Combinations.*

1. *When only two are combined.*—One thing admits of no combination. Two *a* and *b* admit of only one, viz. *ab* Three *a*, *b*, *c*, admit of three, *ab*, *ac*, *bc*. Four of six, viz. *ab*, *ac*, *ad*, *bc*, *bd*, *cd*. Five of ten, viz. *ab*, *ac*, *ad*, *ae*, *bc*, *bd*, *be*, *cd*. *ce*, *de*.

Whence the numbers of combinations of two and two only, proceed according to the triangular numbers, 13, 6, 10, 15, 21, &c. which are produced by the continual addition of the original series, 0, 1, 2, 3, 4. 5, &c. And if *n* be the number of things, the formula for expressing the sum of all their combinations by two's will be

$$\frac{n . n-1}{1 . 2}$$

Thus if $n=2$; this becomes $\frac{2 . 1}{2}=1$

If $n=3$; it is $\frac{3 . 2}{2}$ ——— $=3$

If $n=4$; $\frac{4 . 3}{2}$ $=6$, &c.

2. *When three are combined together* three things admit of one order, *a*, *b*, *c*. Four admit of four, viz. *abc*, *abd*, *acd*, *bcd*. Five admit of ten; *abc*, *abd*, *abe*, *acd*, *ace*, *ade* *bcd*, *bce*, *bde*, *cde*. And so on according to, the first pyramidal numbers, 1, 4, 10, 20, &c. which are formed by the continual addition of the former, or the triangular numbers, 1, 3. 6, 10, &c. And the general formula for any numbers of combinations, taken by three's is $\frac{n . n-1 . n.-2}{1 . 2 . 3}$

So if $n=3$; it is $\frac{3 . 2 . 1}{1 . 2 . 3}=1$

If $n=4$; it is $\frac{4 . 3 . 2}{6}=4$

If $n=5$; it is $\frac{5 . 4 . 3 .}{6}=10$

Proceeding thus it is found that a general formula for any number *n* of things, combined by *m* at each time. is $s=$ $\frac{n . n-1 . n-2 . n.-3, \&c.}{1 . 2 . 3 . 4 .}$ continued to *m* factors or terms, or till the last factor in the denominator be *m*.

So in six things combined by four's, the number of combinations, is

$$\frac{6 . 5 . 4 . 3}{1 . 2 . 3 . 4}=15$$

3. By adding these together the sum will be the whole number of possible combinations of *n* things combined by two's three's four's &c. And all the series, are the coefficients of the power *n* of a binomial wanting only the first two 1 and *n*, therefore the sum will be $\overline{1+1}|^{n}-n-1$, or, $2^{n}-n-1$. *If the number of things be five then* $2^{5}-1=32-6=26$.

11. *To find the number of th*
terations which a number of p
undergo, when combined in all p
eties of ways with themselves an
both as to the things themselve
order and position.

One thing admits of one va
tion.

Two may be varied four
ab, *ba*, *bb*.

Three quantities taken by t
varied nine ways, as *aa*, *ab*, *a*
bc, *cb*, *cc*.

In like manner four thing
twos may be varied 4^2 or 1
and five things, by twos, 5^2

Thus also when taken b
changes will be n^3 and wh
fours, they will be n^4 and
when taken by *n*'s they will b
fore adding all these togeth
number of changes or comb
things taken by two's, by thr
&c. to *m* will be the same
trical series, $n+1^2+n^3$
sum is $=\frac{n^n-1}{n-1}+n$
For example, if the number
four; this gives

$$\frac{4^4-1}{4-1}\times 4=\frac{255}{3}\times$$

COMBRETUM, in botany,
class and order octandria m
which there are four specie
West Indies.

COMBUSTION, in chem
change in the nature of c
dies, accompanied by th
light.

COMET, an opaque, sph
body, like a planet, perfo
tions about the sun in el
having the sun in one of
Astronomy.

COMETARIUM, a mac
ing a representation of th
a comet about the sun.

COMETES, in botany,
pentandria monogynia c
of which there is only one
of the East Indies.

COMMA, among gramm
or character marked thus
a short stop, and to divid
of a period.

COMMENDAM, a ben
astical living which being
vent its becoming so, is
mendatur, to the care of a
plied till a proper pas
When a person is made
nefice is void by the pro
king give him power to re
to hold it in commendam

COMMELINA, a genus
nia order and triandria
ranking under the 6t
They are herbaceous pla
blue or yellow flowers.
species, natives of warm

COMMENSURABLE, a
applied to those quanti
measured by one and th
measure: thus if a line

h 6, equal to 4 inches; these
commensurable, since the
e number 2, measures both.
URABLE *in power*, is said
when their squares are mea-
and the same space.—*Com-*
mbers, in arithmetic, are
an be measured or divided
number, without a remain-
urable surds, are those which
d to their least terms, be-
uantities of their kind, and
ional quantity to another.
CE, the exchange of commo-
r articles, or for some re-
of value, for which other
can be obtained.
ONIA, in botany, a genus of
ia order, in the pentandria
s.
ORE, in the navy, is an officer
nk of admiral, appointed to
quadron of men of war.
, a right or privilege which
m to take or use a portion of
s, woods, &c. in which they
their property. The word is
erstood of common of pasture,
re are four kinds; common
common appurtenant, com-
, and common by vicinage.
LAW, that body of law re-
les in these kingdoms before
was enacted in parliament to
e.
PLEAS, one of the king's
n Westminster Hall, wherein
ustice and three puisne jus-
. In personal and mixed
as a concurrent jurisdiction
rt of king's bench; but has
e of pleas of the crown.
ES, in botany, the name of a
Linnæan system consisting of
having a calyx common to
s or florets.
ICATION *of motion*, the act
ody at rest is put into motion,
tation of motion in a body al-
g. *Lines of communication*, in
are trenches made to continue
e a correspondence between
posts.
IS GEMMA, among botanists,
common contents of the bud,
and fruit.
IS CALYX, a common flower
ing the receptacle and flow-

ADIA, in botany, a genus of
d order triandria monogynia.
RADIX, a bulbous root with
hing hair.
TUM FOLIUM, a leaf of a
stance.
Y, a society of merchants,
or others, united in one com-
. When there are only two,
thus associated, it is called a
; the word company being
fined to a considerable num-
bers associated by prescrip-
tiet. The mechanics of all
porated are thus formed into
which have charters of privi-
m unities. In London they
us, and many of them are
In a commercial *sense the*
ny denotes a large association formed for the purpose of trade; thus we have the Hamburgh company which is the oldest trading establishment in the kingdom, being incorporated in 1296; the Russia company confirmed by charter in 1566; the Eastland company settled in 1579; the Turkey or Levant company in 1581, and confirmed with new privileges in 1605; the company of merchants trading to Africa, established in 1750; the South Sea company, formed in the reign of Queen Anne; the East India company, originally established in 1600; and lastly, the Hudson's Bay company, first chartered in 1670.

COMPANY, in the army, a body of foot commanded by a captain, who has under him a lieutenant and an ensign: the number of men from 50 to 80.

COMPARATIVE ANATOMY, is that which considers the bodies of other animals, serving for the more accurate distinctions of several parts, and supplying the defects of human subjects. Comparative, however, does not strictly stand in contradistinction to human anatomy; but while it embraces the whole circle of animated existence, considers man as the standard of its comparisons, and the primary object of its enquiries.

COMPARISON, in rhetoric, a figure which illustrates one thing, by resembling it to and comparing it with another, to which it has a manifest relation.

COMPARTMENT, in architecture, a design composed of several figures, disposed with symmetry to adorn a parterre, cieling, &c.

COMPASS, *the mariner's*, an instrument used at sea to ascertain the ship's course. It consists of a circular brass box, containing a card with the 32 points of the compass marked thereon, fixed on a magnetic needle, which always turns to the north with a small variation. The needle with the card turns on an upright pin in the centre of the box. The top of the box is covered with glass, and the whole is enclosed in a box of wood, where it is suspended by brass hoops to preserve the card horizontal. *Azimuth compass* is only the mariner's compass with two sights adapted to it, through which the sun is observed to find the azimuth, and from thence to ascertain the declination of the magnetic needle at the place of observation.

COMPLEMENT, in astronomy, the distance of a star from the zenith; or the arc comprehended between the place of the star above the horizon, and the zenith. In geometry complement is what remains of the quadrant of a circle or 90 deg. after an arc has been taken from it: thus 30 deg. 40 min being taken from 90 deg. the complement is 49 deg. 20 min.

COMPLEMENT, in a parallelogram, are the two smaller parallelograms made by drawing two right lines through the diagonal, and parallel to the sides. In every parallelogram these complements are equal.

COMPLETUS *flos*, a complete flower.

COMPLEX *terms or ideas*, in logic, are such as are compounded of several simple ones. *Complex proposition*, is that which has at least one of its terms complex; or *such as contains several members as causal propositions*, or its several ideas offering [illegible] by which we proceed from a general truth to particular ones. In *music*, composition is the art of adapting sounds to airs, songs, &c. either in one or more parts, for the voice or instrument.—In *painting*, composition denotes the choice and disposition of the figures of a picture.

COMPOSITION, in commerce, a contract between an insolvent debtor and his creditors by which the latter agree to take a part of the debt in compensation for the whole.

COMPOSITION, or *composing*, in printing, is the arranging of the types or letters, in the composing stick in order to form a line; and of several lines ranged in order in the galley to make a page; and of several pages to make a form.

COMPOSITION *of motion*, in mechanics, is an assemblage of several directions of motion resulting from several powers, acting in different though not opposite directions.

COMPOSITION *of proportion*, is the comparing the sum of the antecedent and consequent with the consequent in two equal ratios; as suppose 4 : 8 :: 3 : 6 they say by composition of proportion 12 : 8 :: 9 : 6. The same holds of the sum of the antecedent and consequent compared with the antecedent: thus we say 12 : 4 :: 9 : 3. There is a great difference between composition of proportion by addition and by multiplication. See *Proportion*.

COMPOSITUS *caulis*, in botany, a compound stem.

COMPOSITUM *folium*, in botany, a compound leaf.

COMPO [illegible]
[illegible]
ed. The male [illegible]
lyx six-leaved, corolla none,
nectarium ovate. There is
cies, which is a shrub of Ner

CONCAVUM FOLIUM, in
hollowed leaf.

CONCENTRATION, in ge
the bringing things nearer t
whence the particles of salt
said to be concentrated by
the waters part

CONCENTRIC, in mathe
which has the same centre w
opposed to eccentric.

CONCEPTACULUM, in bo
guage, denotes a receiver.

CONCERTO, a musical c
adapted for some particular
with accompaniments for the

CONCERTANTE, a conce
or more instruments, with
ments.

CONCERTINO, the prac
ment in a concerto or concert

CONCERTATO, denotes th
is composed in such a manne
the parts may have their reci

CONCESSION, in rhetoric,
which something is allowed
be disputed, in order to ob
point.

CONCHA, in anatomy, the
vity of the external ear, situ
the meatus auditorius, or pass
internal ear.

CONCHOID, in geometry,
vented by Nicomedes, and u
chimedes in the construction

CONIC SECTIONS.

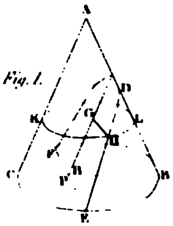
Fig. 1.

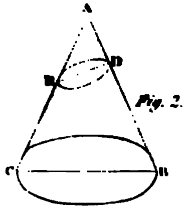
Fig. 2.

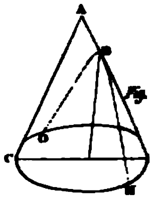
Fig.

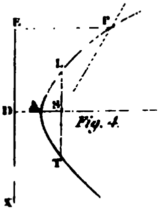
Fig. 4.

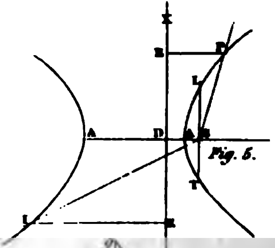
Fig. 5.

Fig. 7.

is a restraint an-
g, so that by the non-per-
y shall sustain loss, and
ce receive advantage.
L SYLLOGISM, in lo-
e the major is a condi-
; thus,
d he ought to be wor-

od;
ght to be worshipped.
, any body which re-
municates the electric

try, a solid figure hav-
base, and its top termi-
alled the vertex. See

n botany, a genus be-
ptogamia class; and in
od to the 57th order,
l species, most of which
slow streams or ponds.
in medicine, an appel-
he kind of small pox,
les run into each other.
ION, that make and
e human body which is
y individual; whence
ed organical, are those
on the mal-conformation

in ecclesiastical polity,
sion granted under his
an and chapter to elect

chitecture, a mould in
r round, or a cavetto,
te two members from

E *Gland*, in anatomy, a
r, wrapt in a fine skin,
eparated from all other
ing a nerve and artery
ving way to a vein and
come out.
ATE *gland*, that which

ties of these curves are, 1. By taking the demonstrations from the sections of a cone. 2. By taking a general property of the figures on a plane from which the others may be determined geometrically, or by taking the general property of each curve, and from it deducing all the other properties of the same curve. 3. By taking the equation to all the curves from whence their respective properties may be had by algebra, or by taking the equation to each singly, from whence its properties may be found by the same means.

Hereby the general property of conic sections is discovered, which makes the basis of the other methods. If they are considered as curves on a plane, they have the same properties as those formed by the intersections of a plane with a cone; and again the equation is produced which forms the basis of an algebraical process. Boscovich has deduced the properties of the three curves from one common property, and his method has been simplified by Mr. Newton of Cambridge. The foundation of his method is the mutual relation of two lines, one drawn from a given point, the other perpendicular to a line of a given position. I. If a point S be assumed without the line DX, (fig. 4, 5,) and while the line S P revolves about S as a centre, a point P moves in it, so that its distance from S shall always be to P E, its distance from the line DX in a given ratio; the curve described by the point P is called a conic section, a parabola, an ellipse, or an hyperbola, as SP is equal to, less, or greater than PE. II. The indefinite right line DX, is named the directrix. III. The point S is the focus. IV. The ratio of SP to PE is the determining ratio. V. If a line SB be drawn through the focus perpendicular to the directrix, it is called the axis of the conic section. VI. The point A is the vertex. VII. A right line LST drawn through the focus parallel to the directrix and terminated by the curve in the points L T is the prin-

= AD, ∴ LT = twice S D, or four times SA. VIII. The tangents DLQ, DTq, (fig. 6, 7.) which are drawn through the extremities of the latus rectum are called focal tangents. IX. The line AM in the ellipse and hyperbola, is termed the transverse axis or major axis. X. If the transverse axis is bisected in C, the point C is called the centre of the ellipse or hyperbola. XI. If a line BC*b* bisected in C, be drawn perpendicularly to the transverse axis, and CB, C*b* be each a mean proportional between SA, SM, the segments of the axis intercepted between the focus and the vertices BC*b* is called the conjugate axis, or axis minor. XII. A right line P N *p* drawn through any point N in the axis parallel to the tangent KAG, or perpendicular to the axis, and terminated by the curve in the points P and *p* is called an ordinate to the axis. XIII. And the segment of this axis AN intercepted between the ordinate and vertex in all the sections, also the other segment NM in the ellipse and hyperbole, is termed an abscissa. XIV. A line passing through the centre of an ellipse or hyperbola, which is terminated both ways by the curve in the former, and by the opposite curves in the latter, is called a diameter. XV. A line drawn through a point in the parabola parallel to the axis is a diameter to the parabola. XVI. The point where a diameter meets the curve is a vertex to that diameter. XVII. If from the centre C, at the distance CA, (fig. 8.) half the transverse axis, a circle be described, cutting the directrix of the hyperbola in the points H *h*, and lines be drawn from the centre through the points of intersection, they are called asymptotes. XVIII. If AM be the transverse axis, and Bb the conjugate axis of two opposite hyperbolas, and two other hyperbolas be described, the transverse axis, of which is Bb and the conjugate A M, these last hyperbolas are conjugate to the former. XIX. If the two axes are equal, the hyperbolas are equilateral. XX. A right line drawn through any point in the diameter of a conic section, parallel to the tangent at its vertex, terminated both ways by the curve, is called an ordinate to that diameter. XXI. A diameter parallel to the tangent at the vertex of any diameter of the ellipse or hyperbola, is termed a conjugate diameter. XXII. A line which is a third proportional to any diameter of the ellipse or hyperbola and its conjugates is called a parameter to that diameter. XXIII. A line drawn through the focus of a parabola parallel to the ordinates of any diameter which is terminated both ways by the curve, is called a parameter to the diameter.

From these fundamental properties all the others are derived, and the curves may be mechanically described. This description depends for the *parabola*, on the property that a line from a point in the curve to the focus is equal to one drawn from the same point perpendicularly on the directrix; for the *ellipse* on the property that the sum of the lines from the foci to a point is equal to the major axis; for the *hyperbola* that the difference of the lines from the foci to a point in the curve is equal to to the major axis.

Description of conic sectio
1. *Parabola*. Let AB, (fig. 9) be
and C a point without it, and l
in the same plane, with the la
so that one side as DK be app
and KF coincide with the poi
F, fix one end of the thread
the other at the point C; and
the thread, as FN, be brought
KF by a pin N; then let the
be removed from B to A agai
DX close to BA; and in the m
the thread will be always ap
side KF, and by the motion of
will be described a curve cal
parabola. Then bringing it to
first position moving from B to
semi-parabola will be describe
2. *Ellipse*. If two points
(fig. 10.) be taken in any pl
them is fixed a thread longer th
tance between them, and this
means of a pin C; and the pin
round from any point till it r
again to the same place, the th
extended all the while, the
cribed is an ellipse.
3. *Hyperbola*. If to the point
one end of the ruler AB be pl
about that point as a centre it
move; and if to the other en
the extremity of the thread
than the ruler AB, and the othe
thread fixed in the point C,
with the side of the ruler AB
place with the given point A,
the thread BD be brought to
the ruler AB by the pin D,
ruler be moved about the poi
to T, the thread extended, a
maining part coinciding wi
the ruler; by the motion of
semi-hyperbola will be descr
ellipse returns into itself; bu
bola and hyperbola are unbo
From the genesis of the s
be seen how one section degen
another. For an ellipsis being
of any section of the cone b
circle and parabola, it is easy
that there may be a great v
lipses produced from the same
when the section is parallel to
the cone then the ellipsis bec
rabola. This again being
whose plane is always parall
of the cone cannot vary as
may; for when it moves fr
rallel position, it degenera
ellipsis or hyperbola, there
may change into an ellipsis,
into a parabola, the parabol
perbola, and this again into
triangle.
Of Equations of Conic Se
equation of a curve is an a
pression, denoting the rela
the ordinate and abscissa; the
to x and the former to y.
Let p be the parameter of
then $y^2 = px$; the equation
bolas. Let a be the diameter
and p, the parameter; the
$\overline{-ax+xx}$ the equation for al
Let a be the transverse diam

CONSTITUTION, an ordinance, regulation, or law made, by authority of any superior, ecclesiastical or civil.

CONSTITUTION, physically, is that particular disposition of the body which results from the properties and mutual actions of the solids and fluids enabling them to exercise their proper functions.

CONSTRUCTION, in geometry, is the drawing those lines of a figure which are previously necessary for the making a demonstration more plain and evident.

CONSTRUCTION *of equations*, in algebra, is the finding the roots of an unknown equation by the geometrical construction of right lines or curves; or the reducing given equations into geometrical figures. And this is done by lines or curves according to the order or rank of the equation.

CONSUMPTION, in medicine, a word extensively applied, implying all disorders that occasion a decay of the animal system, but generally used for the phthisis pulmonalis

CONTACT, in mathematics, is when one line, plane, or body, is made to touch another, and the parts which thus touch are called the points of contact.

CONTENT, in geometry, is the area or quantity of matter or space included within certain limits.

CONTIGUOUS *angles*, in geometry, are those which have one leg common to each angle.

CONTINGENT, something casual or uncertain. Hence future contingent, in logic, denotes a conditional event which may or may not happen according to circumstances. *Contingent* is also a term of relation for the quota which falls to any person upon a division. *Contingent use*, in law, is that which is limited in a conveyance of lands which may or may not happen to vest according to the contingency mentioned in the limitation of the use. A *Contingent remainder* is where no present interest passes; but the estate is limited to take effect, either to a dubious and uncertain person, or upon a dubious and uncertain event; so that the remainder may never take effect.

CONTINUED PROPORTION, in arithmetic, is that where the consequent of the first ratio is the same with the antecedent of the second.

CONTINUO, in music, signifies the thorough bass.

CONTOUR, in painting, is the outline of a figure, and sometimes applied to the general cast or lineaments of the visage.

CONTOURNE, in heraldry, is when a beast is represented standing or running with its face to the sinister side of the escutcheon.

CONTRACT, a covenant or agreement between two or more persons with a just consideration. Contracts are either express or implied. Express contracts are where the term are openly and plainly uttered; implied, are those dictated by reason and justice, thus, if a man takes up goods without agreeing about the price, the law concludes that he contracted to pay the real value.

CONTRA-HARMONICAL proportion, *in* arithmetic, is that relation of three
terms wherein the differe
and second is to that of th
third as the third is to the

CONTRAST, the artificial
works of painting and
groupes, attitudes, or
more effect and beauty

CONTRATE WHEEL, is
is that next to the crown,
hoop of which lie contrary
other wheels.

CONTRAVALLATION,
art, is a line formed in the
as that of circumvallation,
besiegers against the sallie
rison.

CONTRAYERVA, in the
dica, the name by which
dorstenia plant is called in th

CONTRE, in heraldry,
several bearings on acco
ting the shield opposite way

CONTUMACY, in law,
pear in court when legally
the disobedience of the
of a court having power
offence. In England
prosecuted to outlawry.

CONVALLARIA, or
genus of the monogynia
andria class of plants,
tural method under the
mentaceæ. There are
which are natives of Britain
lis or May lily. 2. Multiflo
seal. They may be propa
creeping roots.

CONVERGING, or
geometry, are such as
proach nearer each other.
hyperbola is one whose
towards one another, and
way. *Converging rays*, is
which issue from divers p
ject and after crossing each
diverging rays.

CONVERSE, in mathema
position is called the conver
when after a conclusion
something supposed in the
position that conclusion is
then that which in the other
is now drawn as a conclusi

CONVERSION *of equation*
is when the quantity sought
degree of it being in fraction
is reduced to a common
and then omitting the
equation is continued in the
only.

CONVERSION *of Proposi*
is the changing of the subject
of the predicate, and the
that of the subject; yet al
the same quality of both pro

CONVEX, the external
bous or globular bodies, in op
internal or concave surface.

CONVEYANCE, in law,
passes land from one or mo
others

CONVOLVULUS, *bind-*
of the pentandria class and
order, in the natural method
der the 29th order campan
are 110 species, the principal
1. The sepium, or large wh
which is very troublesome i

ative of the Canaries
a our gardens. The
e blue. 7. The trico-
minor, is a native of
akewise in this coun-
l plant and the flow-
: and variegated. 8.
ea bindweed, called
grows naturally on the
rts of England. The
ish purple colour. 9.
native of the island of
wers are white. 10.
p, used in medicine, is
America. The root is
lky juice, from which
us twining stalks, ris-
t high with variable
s are like those of the
l weed. This plant is
mate unless kept in

t preternatural and
of the membranous
f the body.
ne, a genus of the
order, in the synge-
nd in the natural me-
the 49th order com-
species.
am of Copaiba, a li-
which comes from the
ra balsamum. Dis-
is a quantity of lim-

nus of the monogynia
dria class of plants.
al method under the
re is only one species,
l. grows in Spanish
es do not yield any
ch do are distinguish-

oxyd of copper combined with carbonic acid gas. In a violent heat this metal burns with great brilliancy emitting a green light. The product is an oxyd of copper. There are two oxyds; the protoxide is of a fine orange colour, but the peroxide is black with shades of blue, green and brown. Copper is capable of combining with most of the metals, and some of its alloys are of great use. Copper is sometimes found native and malleable, but generally in a state of ore, sometimes it is blended with the strata of stones and is discovered in blue or green efflorescences. The green and blue ochres are also a kind of ores of copper and the pyrites and marcasites abound with this metal. There is likewise a copper-ore of a reddish grey colour; and another of a dusky purple or black: besides which there are two other appearances of copper ore called lapis lazuli and turquoise. There are good mines of copper ore in Germany and Cornwall.

COPPERAS, a name given to the martial or sulphate of green vitriol.

COPULA, in logic, the verb which connects any terms in an affirmative or negative; as Riches *make* a man happy, where the word make is the copula.

COPULATIVE *Propositions*, are those wherein the subject and predicate are so joined by copulative conjunctions that they may be severally affirmed or denied of one another.

COPYHOLD, in law, a tenure for which the tenant has nothing to shew but the copy of the rolls made by the steward in the lord's court.

COR CAROLI, in astronomy, a star in the northern hemisphere, situated between the Coma Berenices and Ursa Ma-

CORALLINA, or coral, a genus belonging to the order of vermes zoophyta. The species are distinguished by the form of their branches, and are found in the ocean, attached to stones, bones, shells, &c. The corals were formerly believed to be vegetable substances, but are now known to be only a congeries of animals. The islands in the South seas are mostly coral rocks covered over with earth. The little creatures which have hardly sensation enough to distinguish them from plants, build up a rocky structure from the bottom of the sea, till it reaches the surface. Some of the coralline islands are much older than others, and it is probable that as these submarine works are continually going on new islands may be occasionally produced. M. de Peyssonnel of Marseilles discovered in the middle of the last century, that the bodies, which had been taken for flowers were insects inhabiting the coral; for upon taking branches out of the water, the flowers which proceeded from a number of white points disappeared; but on being restored to the water became again perceptible. Through these points or holes the insects come forth; and the cavities corresponding with the holes are the cells they inhabit. When the insects are dead they corrupt and communicate the smell of putrid fish to the water. The milky juice of coral, is the blood of the animal, and running along the furrows perceived on the proper substance or body of coral becomes hard and is changed into stone. The polype or coral insect expands in water and contracts in air, also when touched with the hand in water, or when acids are poured upon it. Broken branches of coral have been seen to fasten themselves to other branches and [illegible]

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d plants; ranking in the
nder the 40th order com-
re 3 species most of them
ountain. They grow from
et in height, terminated by
pound radiated yellow
like the sunflower.
UM, coriander, a genus of
der in the pentandria class
e the natural method ranking
th order umbellatæ. There
h species, both herbaceous an-
nuals of which are useful for
the seeds for medicinal pur-
leaves of both species resem-
parsley; but only one is gene-
ted namely the sativum, which
white fibrous root crowned by
ed leaves with broadish seg-
the centre is an upright, bran-
two feet high, having all the
terminated by umbels of flowers
succeeded by globular fruit. It
gated by seed sown in March.
ds are carminative and stomachic.
RIA, the tanner's or *myrtle-leaved*
a genus of the decandria order, in
ecia class of plants ranking in the
method under the 54th order mis-
æ. There are three species, the myr-
ruscifolia and the sarmentosa. The
two are natives of the south of France,
he last is most commonly cultivated
s country. It is an ornamental plant
The flowers are white. The French
for tanning leather.
RIS, a genus of the monogynia order,
e pentandria class of plants, ranking
e natural method under the dubious
s. There is only one species, the
e pelienss, or blue maritime coris,
which there are two varieties, the one
ing a red and the other a white flower.
y grow wild about Montpellier
RISPERMUM, *tick seed*, a genus of the
ynia order, in the monandria class of
nts, ranking in the natural method un-
the 12th order, holoraceæ. There are
o species but neither of them remark-
le.
CORK, see *Quercus*.
CORK *fossil*, a kind of stone which is a
cies of amianthus, consisting of flexible
res loosely interwoven and resembling
rk. It is fusible by fire and forms a
ack glass.
CORK JACKET, a sort of waistcoat com-
osed of four pieces of cork, two for the
breasts and two for the back, the whole
covered with canvas with two holes to put
the arms through. It was invented by
Mr. Dubourg, but has been improved by
Dr. Wilkinson by cutting the cork into
small pieces and quilting them between
two canvas waistcoats. The most timor-
ous may venture with one of these on, into
a rough sea.
CORN, the grain or seeds of plants se-
parated from the spica or ear, and used in
making bread. It is contrary to the sta-
tute to buy or sell corn in the sheaf, or
otherwise than by Winchester measure.
CORNEA TUNICA, in anatomy, the
second coat of the eye; so named from its
resemblance to the horn of a lanthern.
CORNER-STONES, among builders, the
two stones which stand one in each jamb
of the chimney, commonly made of Ry-
gate or free-stone.
CORNET, among the antients was a
musical instrument resembling a trumpet
used in war.
CORNET, in modern military affairs, is a
commissioned officer in a troop of horse.
CORNUCOPIÆ, a genus of the digynia
order, in the triandria class of plants,
ranking in the natural method under the
4th order, gramina. There are two spe-
cies.
CORNUS, *cornel tree*, *cornelian cherry*, or
dogwood; a genus of the monogynia order,
in the tetrandria class of plants; and in the
natural method belonging to the 47th or-
der, stellatæ. There are 12 species; the
principal of which are; 1. The mas or
cornelian cherry tree, rising 20 feet, and
bearing small umbels of yellowish green
flowers, which are succeeded by small red
fruit, acid but eatable. 2. The sanguinea,
bloody twig or common dogwood, has an
upright stem, branching ten or twelve feet
high with red-shoots and oblong pointed
leaves; all the branches being terminated
by umbellate white flowers, succeeded by
black berries. 3. The Florida or Virginian
dogwood rises to the height of 12 or 15 feet
and has fine red shoots with large leaves
and white flowers, having a large involu-
crum succeeded by dark red berries.
CORNUTIA, a genus of the angiosper-
mia order, in the didynamia class of plants,
ranking in the natural method under the
40th order personatæ. There are two spe-
cies; the principal of which is the pyra-
midata which has blue flowers and hoary
leaves. It grows in the West Indies to the
height of 10 or 12 feet.
COROLLA, among botanists, the most
conspicuous part of a flower surrounding
the organs of generation.
COROLLARY, a consequence drawn
from something advanced or demonstra-
ted.
CORONA, in botany, is a term used for
any thing growing on the head of a seed.
CORONA *borealis*, the northern crown,
in astronomy, a constellation of stars the
number of which in Ptolemy's, and Tycho's
catalogues is 8, and in Flamstead's 31.
CORONAL, or *coronalis*, in anatomy, is
the first suture of the scull.
CORONARY *vessels*, *vasa coronaria*, in
anatomy, certain vessels which furnish the
substance of the heart with blood.
CORONER, a very antient officer at th
common law; and so called because h
acts chiefly in pleas of the crown.
statute no person shall be chosen coron
unless he have land in fee in the cour
The electors also must be freehold
The duty of the coroner is to inquire h
any person came by an untimely de
for which purpose he issues a prece
the constables to return a competent
ber of persons to serve as a jury which
consist of twelve at the least. He may
mit, after inquisition, any person
guilty by the jury of murder or mansl
ter, and may bind over the witnesses
evidence. It is also the duty of the c
to inquire of treasure that is foun
were the finders and also who is su
thereof. By 25 Geo. 2. the coron
have 20s. and 9d. a mile for the

he shall travel to take an inquisition, to be paid out of the county rates.

CORONILLA, *jointed podded colutea*, a genus of the decandria order, in the diadelphia class of plants, ranking in the natural method under the 32d order, papilionaceæ. There are 14 species, all very beautiful plants with bright yellow flowers. The principal is the emerus which grows to the height of 6 or 8 feet with a shrubby stem. The leaves of this plant are deemed laxative and are used instead of senna in some parts of Europe. A dye is also procured from them like that of indigo.

CORPS, in architecture, denotes a part which projects or advances beyond the naked part of a wall, serving as a ground for some ornament.

CORPS, in military affairs, means a body of soldiers. *Corps de garde*, is a post in an army sometimes under cover, or in the open air, to receive a number of men who are relieved from time to time. The term is also applied to the men who watch at the post.

CORPUS, in anatomy, a term applied to several parts of the animal structure as *Corpus callosum*, a medullary part of the brain; *corpus cavernosum*, a cavernous substance surrounding the vagina, &c.

CORPUS CUM CAUSA, in law, a writ issuing out of the chancery to remove the body and record into the King's Bench, there to lie till judgment be satisfied.

CORPUSCLE, in physics, a minute particle or atom, of which natural bodies are formed.

CORRECTION, the pointing out the faults in a printed sheet, that the same may be amended. The corrections are placed in the margin against the line in which the faults are; and there are different characters used for the purpose: thus δ means *dele*, to intimate that a point, letter or word must be taken out. If any word is omitted, the place is to be marked ‸ and the passage or word to be inserted added in the margin. When there are several corrections in the same line they must be separated in the margin by little bars thus, |. If a space is omitted its place is marked with a caret, and in the margin thus, #. When a letter is inverted it is thus expressed @. When any thing is to be transposed it is to be divided thus: The mind of man |always| cannot (for cannot always) and in the margin is placed *tr*. If Italic characters are to be changed for Roman, or the contrary, a line is drawn under the letters and *Rom.* or *Ital.* written in the margin. If a space or an m or n quadrat, stick up, and print black it is marked in the margin with a dash thus, |. If a sentence is omitted, the place is marked with a caret, and in the margin is written the word *out*. If the letters of a word stand too far apart, a line is drawn under them, and in the margin this mark ‿. There are other marks used in correcting, as √ for superior, *cap.* for capital, *l. c.* for lower case, &c.

CORRELATIVE, something opposed to another in a certain relation: as father and son; light and darkness, motion and rest.

CORROSION, the action
away, by degrees, the conti
parts of bodies.

CORROSIVES, in surgery,
which corrode whatever par
they are applied to: as burnt
precipitate of mercury, whi
precipitate of mercury, and
nalis.

CORTEX, in botany, the out
bark of trees.

CORTUSA, *bear's ear*
of the monogynia order, in the
class of plants, ranking in the
thod under the 21st order
are two species; both low,
baceous perennials, having
flowers of a fine red colou
tives of mountainous count

CORUNDUM, a mineral,
are two species, the perfe
perfect. Perfect corundu
is found in the East Indies
Pegu and Ceylon; and it is
ly crystallized. The gene
blue, sometimes without
red, purple, yellow and
fect corundum is usually
sometimes found in am
the colour grey, often shaded
green.

Mr. Klaproth's analysis

98.5	alumine,
1.0	oxyd of
0.5	lime,
100.0.	

CORUS, a measure in Jew
ties answering to the omer,
gallons 5 pints, for liquids,
pint dry measure.

CORUSCATION, a gleam
ing from any thing. It is ch
the electrical fluid, when it be
as the flash of lightning, &c.

CORVUS, the raven or c
nus of birds of the order of pi
is convex and cultrated;
covered with bristly feather
forked and cartilaginous,
of the walking kind. There a
the principal of which are,
or raven, which is of a black
with blue, and the belly d
docile bird and easily dom
has a great propensity to
may be taught to speak like th
not so well. The raven is
bird and of a remarkable
The corone or carrion crow,
resembles the raven in for
It is very common in Engl
frugilegus or rook, is the
no other species of this kind
rious. The principal differ
it and the crow is in the n
of the bill, which in the ro
sides insects it feeds on all
but the rook is of great servi
mer, in extirpating the
chafer beetle. The rooks as
flocks and chuse for their ne
the tallest trees usually calle
They begin to build in March
breeding season they forsake th
and go to roost elsewhere, bu
been observed to return to the

out 17 inches long;
hroat are black, the
e, the rest of the body
y live chiefly on in-
pedula, or jackdaw,
unces. The head is
to the body. It is a
breeds in towers and
drius, or jay, is one
ul of British birds.
streaked with black,
with long feathers,
the form of a crest;
st, belly, and covert
are of a faint purple,
The quill feathers are
some being white,
hers wholly black,
bay colour. Jays
ds. 8. The caryoca-
er, is less than the
colour of the body
, and the wings are
s. These birds sel-
ot abound in Ger-
r magpie in its man-
to the crow, feeding
vegetable food. It
reat art, making a
top, leaving a hole
ance. It is a crafty
up young may be
parrot. 11. The
d crow, is of a slen-
nd thieving, much
d apt to catch up
y it has been even
n fire. It is found
ales, and Scotland.
blue jay, is smaller
the head is crested
part of the neck
and tail are the
of the last are tip-

this order, in the syngenesia class of plants, in the natural method ranking under the 49th order, compositæ. There are four species.

CORYMBUS, properly denotes a cluster of ivy berries. Among botanists it is a mode of flowering in which the lesser flower stalks are produced along the common stalk on both sides, rising to the same height.

CORYNOCARPUS, a genus of the monogynia order, in the pentandria class of plants. There is only one species, a native of New Zealand.

CORYPHA, mountain palm, or umbrella tree, a genus of the order of palmæ, and belonging to the monoecia class of plants. There are two species. The umbraculifera is a native of the West Indies, where it is called codda pana. It grows to a great height, and produces at the top many large palmated, plaited leaves. The flowers are produced on a branched spadix from a compound spatha; they are hermaphrodite, each consisting of one petal, divided into three oval parts, and containing six stamina, surrounding a short slender style crowned with a simple stigma. The germen is roundish, and becomes a large globular fruit of one cell, including a large round stone. The plums have a pleasant taste.

CORYPHÆNA, a genus of fishes belonging to the order of thoracici. There are twelve species, mostly natives of foreign seas. The most remarkable are the blue and parrot fishes. The head of the first resembles that of the spermaceti whale; the mouth is small, each mandible armed with a single row of even teeth closely joined together. On the back is a long fin indented on the edge; behind the gills are two fins, one under the abdomen, and the other behind the anus. The [illegible] the world, [illegible] the [illegible] several [illegible] [illegible]

COSTUME, a term in painting, signifying that every object must sustain its proper character, and that all the parts must correspond.

COSTUS, in botany, a genus of the monandria monogynia class of plants, the flower of which consists of three lanceolated, concave, equal petals, placed erect; the fruit is a roundish capsule, with three cells, containing several triangular seeds. There are three species. The root of this plant, or the costus Arabicus is used in chronic cases, and obstructions of the menses.

CO-TANGENT, in *trigonometry*, the tangent of an arch, which is the complement of another to 90 deg.

COTESIAN *theorem*, in geometry, a term given to an elegant property of the circle discovered by Mr. Coles, by means of which he was enabled to make a farther progress in the inverse method of fluxions. But in the application of his discovery, there remained a limitation which was removed by De Moivre.

COTICE, or *cotise*, in heraldry, the fourth part of the bend.

COTTON, a soft downy substance, found in the seed of the gossypium or cotton tree. It is separated from the seeds by a mill, and then spun. The finest comes from Bengal, and the coast of Coromandel. Cotton is a considerable article in commerce, and is distinguished into cotton wool, and cotton thread. The first is mostly brought from the West Indies, the latter from Smyrna.

COTTON *spinning*, the [illegible]

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the Englis
will take
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as also a
mouth is
small tee
the

or more by deed in writing tered; whereby either or es promises to the other, s done already or shall be wards.

SINE, in geometry, the re- the diameter of a circle l sine is taken from it.

AY, or *Corridor*, in fort fi- of ground, level with the ge of the ditch, three or road, ranging round the other works toward the

E, in law, is applied to a who is under the power and therefore incapable of s to the injury of herself .

aw, a deceitful assent or een two or more, to the other.

husbandry, an iron in- n the beam of a plough, ut the edge of each furrow.

aw, is the original declara- t in a real action, as a de- personal one.

EEL, in the striking part hat which moves round hours.

PPROACHES, in fortifica- nd trenches made by the tack the works of the be- nder their progress. The approach is a trench made from their covered way left of the attacks in order my's works.

ATTERY, is one raised to ner in order to dismount

go contrary ways.

COUNTER-PLEA, in law, a cross plea, particularly such as the demandant alleges against a tenant in courtesy or dower, who prays the king's aid, &c. for his defence.

COUNTER-POINT, in music, the combining and adjusting consonant sounds.

COUNTER-QUARTERED, in heraldry, denotes the escutcheon, after being quartered, to have each quarter again divided into two.

COUNTER-SALIENT, is when two beasts are borne in a coat leaping from each other a contrary way.

COUNTERSCARP, in fortification, is the exterior slope of the ditch, though it is often taken for the covered way and glacis. *Angle of the counter-scarp* is that made by its two sides meeting before the middle of the curtain.

COUNTER-SWALLOW *tail*, in fortification, an outwork in the form of a single tenaille, wider at the gorge than the head.

COUNTER-TENOR, in music, high tenor; a term applied to the highest natural male voice.

COUNTER-TRIPPING, in heraldry, is when two beasts are borne in a coat in a walking posture, the head of the one being next the tail of the other.

COUNTERS, in a ship, are two, 1. the upper counter which is the hollow arching from the gallery to the lower part of the straight piece of the stern. 2. The lower counter which is between the transum and the lower part of the gallery.

COUP-DE-MAIN, in military affairs, implies a desperate resolution in all small expeditions of surprize; or the attacking a place sword in hand.

COUPED, *coupe*, in heraldry, is used to stones, level or of the same height throughout the whole length of the building.

COURSES, in a ship, the mainsail, foresail, and mizen; also the mizen and forestay sails.

COURT, a place set apart for the administration of justice. The most general division of our courts is into such as are of record and those which are not; those of record again are divided into supreme and superior, or inferior. The supreme court of this kingdom is the high court of parliament which has an absolute power to make new laws, and to repeal and alter old ones. Superior courts of record are the house of lords, the chancery, king's bench, common pleas, and exchequer; the less principal are those held by commission of gaol delivery, oyer and terminer, assize, nisi prius, &c. The inferior courts of record are corporation courts, courts leet, the sheriff's torn, &c. Courts not of record are the courts baron, county courts, hundred courts, &c.; also the admiralty and ecclesiastical courts, which derive their authority from the crown, and are subject to the control of the king's temporal courts when they exceed their jurisdiction.

COURT BARON, is a court held by every lord of a manor within the same; and if the number of suitors should so fail as not to leave enough to make a jury or homage, that is, two tenants at least, the manor is lost. This court may inquire of the death of tenants, of nuisances, waste, trespass, forfeitures, &c. and the punishment is by amercement.

COUSU, in heraldry, a piece of another colour or metal so placed on the ordinary as if sewed thereon.

COWARD, in heraldry, a term for a lion, borne in an escutcheon when his

for raising and lowerin
Common cranes are thus
principal member is a str
or arbor fixed in the grou
by eight arms, coming fro
of four pieces of wood la
the middle of which pas
beam. About the middl
arms meet being mortis
ends in an iron pivot on
verse piece projecting t
called the jib. The mid
this are sustained by arm
dle of the arbor; and ov
to one end of which the
the other about the spi
which when turned dra
thereby heaves up the
cranes have usually bee
kinds; in the first call
crane, the whole machin
strong axis; in the seco
bet alone moves on its a
if the machinery is moved
within the wheel, as w
practice, the labourers ar
ful accidents: on which
ingenious mechanics have
more safe and powerful
or walking crane. Mr.
invented one which has
with different staves that
to the cogs of a horizontal
upright axle, round which
rope that draws up the
wheel has ninety-six cogs;
trundle twenty-four staves,
twelve, and the smallest six;
largest revolves four times
lution of the wheel, the next
the smallest sixteen. A
onally fixed on the axis of
trundles for turning it; and
one or the other according to

a genus of the
s and order of
t species which
s.
embling gauze,
and twisted on
ut crossing.
a genus of the
polygamia se-
one species, a

hysic, the thick
d, called also
m the serum or

ine, or live-ever,
order, in the
ranking in the
13th order, suc-
cies, all natives
al are cultivat-
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one *to* six feet
ented with ob-
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greenish.
e tree, hawthorn,
a order, in the
ranking in the
36th order, po-
species, the
yacanthus haw-
, of which
es, the large
low hawthorn,
uble-blossomed,
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it was planted
of Arimathea,
ground, when
blossomed. It
er. 2. The aza-
orn, is a native

May. There is a variety of this species called the Carolina hawthorn with larger leaves, flowers, and fruit, and no thorns. 8. The viridis, or green-leaved Virginian hawthorn, has no thorns on the stem and branches. The leaves are wholly green and the flowers which are white come out in May being succeeded by a roundish fruit which ripen in autumn. The different species are propagated by seeds; and the varieties are combined by budding them upon stocks of the white thorn.

CRATER, in astronomy, a constellation of the southern hemisphere, consisting in Ptolemy's catalogue of 7 stars, in Tycho's of 8 and in Flamstead's of 31. Crater also denotes the mouth or opening of a volcanic mountain.

CRATEVA, the *garlic pear*, a genus of the monogynia order, in the dodecandria class of plants; ranking in the natural method under the 25th order, putamineæ. There are 5 species natives of both Indies. They are trees and chiefly distinguished by their fruit. That of the tapia or garlic pear is smooth and round, about the size of an orange with a hard shell which incloses a mealy pulp, filled with kidney-shaped seeds. It has a strong smell of garlic. The marmelos grows to the size of a large tree and the flowers have the smell of roses. These are succeeded by a fruit of the size of an apple covered with a hard shell and containing a soft pulp tasting like quinces. From the flowers of this plant is distilled an odoriferous cordial; and from the pulp various kinds of marmalades are made.

CRAX, the *curassow*, a genus of birds belonging to the order of gallinæ. There are 5 species; 1. The alecator or Indian hen of Sloane, which is of the size of a small turkey. It is black, but the belly in his lap; and the part of the picture he is painting should be rather below his face. The windows should be darkened to the height of six feet from the floor, and the subject to be painted so placed that the light may fall with advantage on the face.

CRENATED, a term used by botanists, for leaves that are notched.

CRENELLE or *embattled*, in heraldry, is used when any honourable ordinary is drawn like the battlements of a wall.

CREPIS, *bastard hawkweed*, a genus of the polygamia order in the syngenesia class of plants, ranking in the natural method under the 49th order compositæ. There are 20 species mostly herbaceous annuals rising to the height of a foot or a foot and a half having the branches terminating by large compound red and yellow flowers, succeeded by a quantity of seed which if left on the ground will produce several young plants.

CREPITATION, or detonation in chemistry, is the noise made by some salts over the fire in calcination. In surgery it is the sound made by the ends of bones when the limb is moved that the existence of a fracture may be ascertained.

CREPUSCULUM, in astronomy, twilight; the time from the first dawn of the morning to the rising of the sun; and between his setting and the last remains of day. It is usually computed to begin and end when the sun is about 18 deg. below the horizon. It lasts longer in the solstices than the equinoxes and in an oblique than a right sphere. The crepuscula are occasioned by the sun's rays refracted in our atmosphere.

CRESCENT, in heraldry, a bearing in the form of a new moon.

CRESCENTIA, the *calabash tree*; a genus of the angiospermia order, in the di

plate or matt
to relievo.

CRINODE
of plants of
phia decandri
shaped, six
gaping at the

CRINUM,
order, in the
ranking in the
9th order, spa
greenhouse pl
having large f
white, or strip
smell. There

CRITHMU
digynia order,
plants, ranking
der the 45th
are three speci
is the marit
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root; thick su
rising two feet
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sea-coast amon
principal use of

CROCODILE,

CROCUS, *saf*
gynia order, in t
ranking in the n
6th order, ensat
1. The officinal
crocus, which ha
bulbous root, fr
leaves of a deep
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long, standing on
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rous varieties.

CROISSANTE

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a genus be-
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this species is
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nakes abound
. Their bite is
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deep brown
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n the back.
America and

shaped and of a deep red colour. The fruit is inclosed in a cover like the chesnut; and consists of three white grains each having a capsule and within that a stone. This stone is surrounded with a white pulp which is not the tallow, for that is expressed from the kernels and the Chinese make their candles of it. 3. The aromaticum, with heart-shaped serrated leaves and an arborescent stem. The bark of this tree is the same with the cascarilla and eleutheria. It is a strong bitter and has been used in intermittent fevers in preference to the Peruvian bark. 4. The cascarilla described by Dr. Wright is the wild rosemary shrub of Jamaica, but its bark has none of the qualities with the preceding.

CROTOPHAGA, a genus of birds belonging to the order of picæ. The most remarkable species is the ani, which is about the size of a black bird; the colour of the whole bird is black, in some parts glossed with purple, and about the neck faintly tinged with green on the margins. It is found in Jamaica and South America. These birds unite in concert, and many of them occupy the same nest, attending to each other's young with as much affection as to their own.

CROUP, a disease incident to children, consisting of an inflammation of the windpipe, accompanied with a secretion of mucus or phlegm. The treatment is bleeding, after which an emetic should be given: a blister between the shoulders will also be serviceable, and the body be kept open.

CROUP *of a horse*, is the extremity of the reins above the hips.

CROW, see *Corvus*.

CROW, in mechanics, a kind of iron lever sharp at one end and a claw at the other, used for heaving or pushing great right line round the centre, to which the moving part is not contiguous.

The area of a crown is had by multiplying its breadth by the length of the middle periphery; for a series of terms in arithmetic progression being $n \times \frac{a+w}{2}$, *i. e.* the sum of the first and last multiplied by half the number of terms, the middle terms must be $\frac{a+w}{2}$ therefore, that multiplied by the breadth or sum of all the two terms will give the crown.

CROWN-POST, in building, a post which stands upright in the middle between two principal rafters with braces to the middle of each.

CROWN-WHEEL *of a watch*, the upper wheel which by its motion drives the balance. In royal pendulums it is called the swing-wheel.

CROWN-WORK, in fortification, an outwork having a large gorge, and two long sides terminating towards the field in two demi-bastions. It is intended to inclose a rising ground, or to cover an intrenchment.

CRUCIANELLA, *petty madder*, a genus of the monogynia order, in the tetrandria class of plants; ranking in the natural method under the 47th order, stellatæ. There are nine species, natives of the southern parts of Europe.

CRUCIBLE, a chemical vessel made of earth, and so tempered as to endure the strongest heat.

CRUCITA, a genus of the digynia order, in the tetrandria class of plants, ranking under the dubious order. There is only one species.

CRURÆUS *musculus*, in anatomy, a fleshy mass, covering nearly all the foreside of the os femoris, between the two vasti.

CRURAL, in anatomy, the name of an artery which conveys blood to the crura or legs, also the vein by which this blood returns to the heart.

CRUSTACEOUS *fish*, are those covered with shells, consisting of several pieces or scales as crabs, lobsters, &c.

CRYPSIS, a genus of the diandria digynia class and order of plants. There is only one species which is a grass of Siberia.

CRYPTOCEPHALUS, a genus of coleopterous insects, consisting of 268 species.

CRYPTOGAMIA, a class of plants in the Linnæan system, the organs of fructification of which are either concealed within the fruit, or so minute as to elude observation. It has four orders, filices, musci, algæ, and fungi.

CRYPTOSTOMUM, a genus of the pentandria class and order of plants; of which there is one species a shrub of Guiana.

CRYSTAL, in natural history, the name of a large class of fossils, hard, pellucid, and colourless.

CRYSTALLINE, in medicine, is a transparent pustule filled with water. Crystalline humour in the eye is that which lies behind the aqueous one.

CRYSTALLIZATION, the coagulation of essential, fixed, and volatile salts, which after evaporation are left to dry, concrete and shoot into crystals. All substances may be di[illegible] liquid and gaseous. Crys[illegible] to the first, the two last [illegible] of retaining a regular [illegible] be made to assume a so[illegible] case they usually crystal[illegible] bodies either occur in the[illegible] or may be made so: a[illegible] cular form which every [illegible] when it crystallizes. T[illegible] assumes the shape of a [illegible] octahedron, salt petre, a[illegible] sulphat of magnesia, a [illegible] and carbonat of lime th[illegible] There are however co[illegible] tions according to circ[illegible] tion is the common met[illegible] ing salts. They are d[illegible] which is slowly evap[illegible] particles gradually app[illegible] combine and form sma[illegible] become larger by the [illegible] particles till they fall b[illegible] the bottom of the vesse[illegible]. Or a [illegible] solution being prepared [illegible] set to cool. On the esca[illegible] the salt crystallizes. Such [illegible] form in groups attached to the [illegible] bottom of the vessel, or [illegible] pellicle. They usually contain [illegible] ter of crystallization than the [illegible] But there are substances [illegible] tallization which are not soluble [illegible] These are glass, metals, and [illegible] The method employed to crys[illegible] is fusion, by which means [illegible] separated from each other; [illegible] cooling proceeds gradually they [illegible] themselves into regular crystals.

CUBÆA, in botany, a genus of the [illegible] candria monogynia class and [illegible] Calyx turbinated, five-parted, [illegible] permanent; petals, five, [illegible] ments villose, three shorter; [illegible] dicelled; legume villose; six or seven [illegible] ed. There are two species.

CUBE, or hexahedron, a solid [illegible] body, consisting of six equal squar[illegible] It is supposed to be generated by [illegible] tion of a square plane along a line [illegible] and perpendicular to one of its [illegible]

To determine the surface and solidity [illegible] *cube.* Multiply one side by itself [illegible] will give one square; this multiplied [illegible] 6 will give the whole surface. [illegible] tiply one side twice by itself, that is, [illegible] it, and that will give the solid [illegible]

CUBES or CUBIC NUMBERS, are [illegible] ed by multiplying any numbers twice [illegible] themselves.

Thus the cubes of 1, 2, 3, 4, 5, 6, &c.
are 1, 8, 27, 64, 125, [illegible]

CUBE, *duplication of the*, is the finding [illegible] the side of a cube that shall double [illegible] duy a given cube. It cannot be [illegible] metrically, as it requires the solution [illegible] cubic equation, or the finding two [illegible] proportionals. Let a be the side [illegible] given cube, and z that of the double [illegible] then $z^3 = 2a^3$, or $a^2 : z^2 :: z :$ [illegible] fore if a and z be the 1st and 2d terms [illegible] set of continued proportionals then [illegible] is the ratio of the square of the 1st to [illegible] of the 2d, which is the same as the [illegible] of the 1st term to the 3d or the [illegible]

e *Arithmetic*.
a of the shops, in the
small dried fruit, re-
rought from Java.
om, in algebra one whose
nts of three dimensions
or $x^3 + rxx = p^3$ &c.
re of length equal to a
e elbow to the extremity
. Arbuthnot states the
inches, the Roman at 1
nd the Hebrew at 1 foot

e of the arm reaching
the wrist, called like-

ery-bearing chick-weed,
mia order in the decan-
: ranking in the natu-
he 22d order, caryophy-
species, the principal
The lichen, or Swedish
eager a native of seve-
e. The flower is pur-
pearance of net work.
Gothland use the leaves
eruptions. 2. The ca-
owering lychnis, grows
and Italy. It is a pe-
g a foot and half high.
lue and are closed all
sun descends they ex-
agreeable smell. 3.
h fly is a native of Bri-
ts of Europe. At the
here exudes a viscous
ects settle thereon they
emselves. The flow-
h colour.
us of coleopterous in-
ere are eleven species,
ble.

Hope, where it guides by its note the persons who go in search of wild honey. 3. The capensis or Cape cuckow is somewhat smaller than the European. It also inhabits the Cape of Good Hope. 4. The honoratus or sacred cuckow, inhabits Malabar and feeds on reptiles. The inhabitants hold it in great veneration. 5. The vetula is larger than a black bird, and is a native of Jamaica. It is very tame and easily taken. It feeds on lizards, frogs, small snakes, and young rats and birds. It is called the rain-bird from its making a great noise before rain. 6. The cayanus or Cayenne cuckow is of the same size with the preceding. The inhabitants of Cayenne call it the devil, and account it a bird of bad omen.

CUCUMBER, *cucumis*, a genus of the syngenesia order, in the monoecia class of plants; ranking in the natural method under the 34th order, cucurbitaceæ. There are 13 species, the most remarkable of which are,

1. The sativa or common cucumber, of which there are the following varieties. 1. The common rough green prickly cucumber; middling sized fruit, about six or seven inches long; this plant is hardy but does not shew its fruit early. 2. The short green prickly cucumber, is about three or four inches long, the rind rather smooth, with small prickles. It is one of the earliest kinds. 3. The long green prickly cucumber, grows from six to nine inches in length, and is thinly set with prickles: this is the best variety. 4. The early green cluster is short and remarkable for growing early and in clusters. 5. The long smooth green Turkey cucumber, grows from ten to fifteen inches in length without prickles. 6. The long smooth white Turkey cucumber is a smooth rinded fruit

ference, having a hard shell. 2. The pepo, pompion or pumpkin has strong trailing stalks, branching into numerous runners, which extend forty or fifty feet. They have yellow flowers; and the fruit is sometimes as large as a peck. 3. The verucosa or warted gourd has trailing stalks and a moderately sized fruit, white, knobby, and roundish. 4. The melopepo, erect gourd or squash. 5. The hispida. 6. The ovifera. 7. The citrullus or water melon whose fruit is a foot and a half in diameter. It is much esteemed in hot climates for its coolness. In this country these plants are chiefly cultivated for curiosity; though when mixed with apples the pulp makes good tarts. In the Indies the bottle-gourds are used for holding water.

CULEX, the *gnat*, a genus of insects of the order of diptera of which there are seven species. Before they attain the flying state they are small grubs in the water, after which they turn to chrysalids, from whence they pass to the state of a gnat and fly into the air. The sting of the gnat is a tube containing five or six spicula, some dentated like the head of an arrow, and others sharp edged. These spicula introduced into the veins act as pump-suckers into which the blood ascends. The pain occasioned by the sting may be removed by volatile alkali, or washing the wound with vinegar. Gnats engender in the air, and the female deposits her eggs on the water, placing them one by the side of another in the form of a little boat. This vessel composed of two or three hundred eggs, swims on the surface for two or three days, after which they are hatched.

CULM, among botanists, a straw or haulm, defined by Linnæus to be the pro-

in the decandria class of
with those called dubious.
species a native of the
Hope.

CUOGOLO, a stone used
tians in making glass. It
colour, of a shattery
like a pebble.

CUP-GALLS, in natural
gular kind of galls formed
of the oak and other trees.
ble a drinking glass with
last is flat and has a small
the centre.

CUPANIA, a genus of the
order, in the monoecia
ranking in the natural
tricoccæ. There are three
are small trees in the West
remarkable.

CUPEL, in metallurgy,
which absorbs bodies when
into a fluid scoria; but
they are in a metallic
made of bone ashes.

CUPELLATION, the art
or silver by means of a
purpose another vessel
used within which may
more cupels.

CUPOLA, in architecture
vault, or the round top of
church.

CUPPING, in surgery,
applying cupping glasses
charge of blood and other
skin.

CUPRESSUS, the *cypress*
the monadelphia order,
class of plants, ranking in
thod under the 51st
There are seven species
principal are, 1. The

elm tree.
uric, a genus of the
n the monandria class
e the natural method
r, scitamineæ. There
e rotunda with a round
ure of a pale yellow.
ng roots of a *deep yel-*
ers of a yellowish red.
annual plant in which
m the others. These
ly in India whence the
o Europe. They are
w; and in medicine as
undice.
fruit of a species of
white and red sorts are
the black are em-
English spirits, and
brandies. The jelly
ous in sore throats.
a small kind of grapes
and Cephalonia.
eam of water flowing
Currents at sea are
asioned by the diurnal
round its axis, or ac-
the waters being dri-
nds, or into gulfs and

rrents are settings of
hips are driven out of
method of ascertaining
ents is this: Take the
ompass, a log-line and
pot, and a coil of two
n at a proper distance
the kettle overboard,
y or one hundred fa-
t will become station-
g, and turn your half
ving at the same time
e log by the compass;

allotted to several countries.

CURSOR, in mathematical instruments, a small piece that slides; as in an equinoctial ring dial; also a point screwed on the beam compasses.

CURTAIN or *Curtin*, in *fortification*, that part of the rampart of a place between the flanks of two bastions, bordered with a parapet five feet high, behind which the soldiers stand to fire upon the covered way and into the moat.

CURTATE *distance*, in astronomy, the distance of a planet from the sun to that point where a perpendicular let fall from the planet meets the ecliptic.

CURTISA, a genus of the tetrandria monogynia class and order of plants. There is one species which is a tree of the Cape of Good Hope.

CURVATURE *of a line*, is the peculiar manner of its bending, whereby it becomes a curve, possessing particular properties. Of all the circles that touch a curve in a given point, that is said to have the same curvature with it which touches it so closely that no circle can be drawn through the point of contact between them; and this circle is called the circle of curvature; its centre the centre of curvature; and its semi-diameter the ray of curvature belonging to the point of contact.

CURVE, in geometry, a line which running on continually in all directions, may be cut by one right line in more points than one.

CURVES, *family of*, according to Wolfius, a concries of several curves of different kinds, all defined by the same equation of an indeterminate degree, but differently according to the diversity of their kinds.

CURVILINEAR, or *Curvilineal*, a term applied to figures that are bounded by

[illegible] the stern
[illegible] figure.
[illegible] in an
[illegible]
[illegible] we call
[illegible] corpus reticulare.

CUTIS, the skin, in anatomy, is that strong covering which envelopes the whole surface of animals. It consists chiefly of two parts, a thin white elastic layer on the outside called the epidermis or cuticle; and a thick one composed of many fibres closely interwoven and disposed in different directions: called the cutis or true skin.

CUTTER, a sloop rigged vessel built sharp for sailing: generally used in smuggling, or in the navy to watch the coast and to look after such vessels as are engaged in contraband trade.

CUTTING, in heraldry, the dividing a shield into two equal parts, from right to left parallel to the horizon.

CYANELLA, in botany, a genus of the hexandria monogynia class and order of plants. There are three species natives of Africa.

CYANITE, a stone commonly found in granite rocks. It is white with shades of sky blue.

CYCAS, a genus of plants belonging to the first natural order palmæ. The fruit is a dry plum with a bivalve kernel. There are two species. The circinalis or sago tree which grows in the East Indies particularly on the coast of Malabar. It rises to the height of 4[illegible] feet, and the leaves are seven or eight feet long. The flowers grow in long bunches at the footstalks of the leaves, and are succeeded by oval fruit, about the size of large plumbs of a red colour when ripe, and of a sweet taste. Each contains a nut inclosing a white kernel [illegible]

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CYDONIA,
Cydon in Cre
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lusit e is that
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and makes a go
CYGNUS, in
of the northern

genus of plants of the
dynamia angiospermia.
cies, which is an herba-
mountains of Dauria.
, the oriental chrysolite
has been found only in
nd in Siberia. The co-
n green, and the surface

the quinsey or inflam-
ces, tonsils, &c. Cullen
cies, as 1. Cynanche ton-
che maligna. 3. Cynan-
. Cynanche pharyngæus,
sidea.
, *bastard dog's-bane*, a
ynia order, in the pen-
lants, ranking in the na-
der the 30th order, con-
r 27 species, of which the
The acutum or Montpel-
2. The Monspeliacum or
Montpelier scammony.
d a milky juice, which in
has been sold for scam-

artichoke, a genus of the
lis order, and of the syn-
plants. There are four
two are cultivated for
nius or garden artichoke,
perennial roots, crowned
eaves two or three feet
ddle are upright stalks a
top of which is a scaly
f numerous scales inclos-
ing on a broad fleshy re-
with the base of the scales
part of the plant. There
es, the conical green-
tichoke, and the globular
n artichoke. 2. The car-
oon, which is larger than
The former is propagated

ruleus or blue dog-tail grass; and the paniceus or bearded dog-tail grass.

CYNOSURA, in astronomy, the same with Ursa Minor or Little Bear.

CYPERUS, a genus of the monogynia order in the triandria class of plants; ranking in the natural method under the 3d order, calamariæ. There are 33 species, the principal of which are the round, the long sweet cyperus and the papyrus. The long cyperus is used by perfumers and glovers. The papyrus is celebrated for its early use as paper.

CYPRÆA, or *gowrie*, a genus of insects of the order of vermes testaceæ. It is of the snail kind; and there are 41 species, distinguished by the form of their shells.

CYPRESS, see *Cupressus*.

CYPRINUS, a genus of fishes of the order of abdominales. There are 31 species. The most remarkable are, 1. The carpio or carp, which chiefly abounds in the rivers and lakes of Polish Prussia. Carp is a long-lived fish, and instances are related of some that have attained the age of 100 years. The carp is very cunning, and on that account is called the river fox. It is very shy in taking a bait, but in spawning time it is easily caught. In Prussia carp are often kept some time out of water, and grow fat in their new element. They are suspended in a net in a cellar, and plunged in water every four or six hours. 2. The barbel is a coarse fish, and the roe is so noxious as to produce vomiting, purging, and a swelling in those who unwarily eat of it. The barbel is about three feet long, and the dorsal fin is armed with a strong spine, with which it inflicts a dangerous wound. 3. The tinca or tench, is reckoned a delicious food in this country. It weighs generally 4 or 5lbs. and is thick and short. The colour of the back is dusky, but the [illegible] a genus of the class and order [illegible] [illegible] very handsome plant.

CYRTANTHUS, a genus of plants of the class and order hexandria monogynia. There are two species, which are bulbs, natives of the Cape of Good Hope.

CYST. The bag or tunic including all cysted humours, as the schirrhus, atheroma, steatoma, and meliceris

CYTINUS, a genus of the dodecandria

[illegible]
sh[illegible]
fl[illegible]
[illegible]
[illegible]
[illegible]
flowers.
or Tartar
shrubby s
smooth w
yellow fl
All the sor
propagate

D

D, the fourth letter of the alphabet, and as a numeral denoting 500, with a dash over it 5000. In abbreviations it has various significations, as D D, doctor in divinity; M. D, doctor in medicine; D. D. D. dat, dicat, dedicat; D. D. D. D. dignum deo donum dedit. In music D marks in thorough bass what the Italians call descanto, denoting that the treble ought to play alone, as T does the tenor, and B the bass. D C means the abbreviation of da capo or from the head.

DACTYL, in ancient poetry, a metrical foot consisting of one long and two short syllables.

DACTYLIS, *cock's foot grass*, a genus of the digynia order, in the triandria class of plants, and in the natural method ranking under the 4th order, gramineæ. There are [illegible]

delphia orde
plants, rank
der the 3[illegible]th
species of wh
Jamaica. It i
a great heigh
hairs which
touch them.

DAMAGE,
a man receiv
law damages
a man by a ju
injury susta
the jury may
plaintiff lays
they cannot

DAMAGE
of another co

ad order of plants. There is on-
ies which is a native of India.
noxious exhalations which
some parts of the earth and
to those who breathe them.
chiefly observed in mines and
here they are distinguished by
s into two sorts, choke and
. The first is carbonic acid gas,
y in even those places which
formerly worked, but become
nd wastes. This damp chokes
instantly. The other which
d of hydrogen gas rises to the
workings and explodes with
nce.
TÉ, in heraldry, is when the
bordure or ordinary is indent-

Persian silver coin weighing
n of a drachm; also a weight
ins.
, *spurge laurel*, a genus of the
order, in the octandria class
nging in the natural method un-
order, vepreculæ. There are
the principal of which are: 1.
, the mezereon or spurge olive.
deciduous shrub; and is a na-
many and this country. There
rieties, 1, the white, 2, the pale
rimson, 4, the purple flowered.
elegant plants. 2. Cnidium,
red daphne, is a low deciduous
tive of Italy, Spain, and about
r. 3. Cneorum, the spear-lea-
is a native of Switzerland,
he Alps, and the Pyrenees.
s are of a purple colour and
nt. 4. Tartonraira, the oval-
ne, a low deciduous shrub, is a
France and Italy. It is of
of two feet covered with
wn bark. The leaves are
shining. The flowers are
ucceeded by roundish berries.
he Alpine daphne or chame-
w shrub, and a native of the
va, Italy and Austria. The
ear-shaped and hoary beneath.
s grow in clusters and are
by red berries. 6. Thymelea
ort-leaved daphne, is also a
nd a native of Spain and the
[illegible]. It is about three feet
e leaves resemble those of the
The flowers are of a greenish
he berries yellow. 7. Villosa,
eaved daphne is a low shrub
e of Spain and Portugal. This
ne situations retains its leaves
8. Laureola, the spurge laurel
n daphne, is a low shrub com-
ain, Switzerland and France.
the height of three or four
flowers are fragrant and come
ginning of January. 9. The
delightful shrub and has its
the fragrance of its flowers.
enhouse plant. The root of
on was used in the Lisbon
nd is employed in the form of a
the decoctum sarsaparillæ
of the college of *physicians.*
sidered useful in cu-
taneous eruptions.
in logick, one of the modes
f the third figure, whose

premises are universal affirmatives and the conclusion a particular affirmative, thus:

Dar. Every body is divisible;
Ap. Every body is a substance;
Ti. Therefore some substance is divisible.

DARIC, a gold coin first made by Darius the Mede about 538 BC. According to Dr. Bernard it weighed two grains more than a guinea.

DARII, in logick, one of the modes of syllogism, of the first figure, wherein the major proposition is an universal affirmative, and the minor and conclusion particular affirmatives.

DASYPUS, *armadillo*, a genus of quadrupeds of the bruta order. The generic character is, grinders several, without cutting or canine teeth; body coated with a shelly armour.

The armadillos are natives of South America, and are distinguished from other quadrupeds by the singular covering with which nature has ornamented them; and which forms a complete armour, divided into zones, in such a manner as to accommodate itself to the various postures of the body. They are harmless, and inhabit burrows, which they excavate by means of their claws. They wander about chiefly by night, devouring roots and grain, also on worms, insects, &c.

They are considered as excellent food, and are therefore dug out of their subterraneous cavities, and sold for the table. When attacked, the armadillo rolls itself into the form of a ball, and thus becomes in a great degree invulnerable. They are very prolific, and are said to breed three or four times a year, the species are,

1. Dasypus tricinctus, or three-banded armadillo; this may be considered, perhaps, as the most elegant; the pattern of the armour being peculiarly neat, and the colour of the animal more pleasing than in most other species, viz. a clear yellowish-white. The head, shoulders, and hind part of the body, are coated with regular hexagonal divisions, curiously studded on the surface; and the three zones of the body are extremely distinct. The ears are large, and the claws smaller than in most other species. It is a native of Brazil.

2. Dasypus sexcinctus, or six-banded armadillo, is also a species of great elegance; and resembles the former, but is furnished with six bands. The tail is thick, and short; the claws are very large and strong.

3. Dasypus septemcinctus, or seven-banded armadillo. It is impossible to consider this in any other light than as a mere variety of the nine-banded armadillo, in which the pattern of the armour and the proportion of the parts, are sufficient to ascertain the species.

4. Dasypus novemcinctus, or nine-banded armadillo. The bands are extremely distinct, and transversely marked by numerous triangular figures alternating with smaller opposite ones; the head is smaller, longer in proportion, and sharper-snouted, than in any other species; the fore and hind parts of the shield or covering are marked by numerous flat rounded scales or tubercles, with smaller ones interposed; the ears are mode-

[illegible] seems most [illegible] to the twelve-hand d[illegible] arma-[illegible]

DATA, a mathematical term for things [illegible] which are given or known [illegible] which are unknown. In Euclid the word is used for those spaces, lines and angles are given in magnitude, or to which equal ones can be assigned.

DATE, in law, the description of the day, month, year of our Lord, and year of the king in which a writing is made. In writings of importance the date should be in words at length. An antedate is that prior to the real time when the instrument was signed. A post date is that which is posterior to the real time.

DATE. See *Phœnix*.

DATISCA, a genus of the dodecandria order, in the dioecia class of plants ranking in the natural method under the 54th order, miscellaneæ. There are two species; but not remarkable.

DATISI, in logick, a mode of syllogism in the third figure, in which the major is an universal affirmative, and the minor and conclusion particular affirmative propositions.

DATIVE, in grammar, the third case in the declension of nouns, expressing the state of a thing to whose profit or loss some other thing is referred. It is called dative, because usually governed by a verb, implying something to be given to some person. In English this relation is expressed by *to* or *for*.

DATURA, the *thorn apple*, a genus of the monogynia order, in the pentandria class of plants, ranking in the natural method under the 28th order luridæ. There are 8 species, the principal of which are, the stramonium, or common thorn apple

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DECUSSORIUM, a surgeon's instrument, which, by pressing gently on the dura mater, causes an evacuation of the pus collected between the cranium and the before-mentioned membrane, through the perforation made by the trepan.

DEDIMUS *potestatem*, in law, a commission granted to one or more persons, for the forwarding and dispatching some act appertaining to a judge, or some court.

DEED, a written contract sealed and delivered. It must be written before the sealing and delivery, otherwise it is no deed; and after it is executed by the parties nothing can be added; and therefore, if a deed is sealed and delivered with a blank left for the sum, which the obligee fills up after sealing and delivery, this will make the deed void.

DEEP-SEA-LINE, or *dip-sea-line*, in the sea-language, a small line used with some a hundred and fifty fathoms long, with a plummet hollow at the head, and tallow put into it, to bring up stones, gravel, sand, shells, and the like, from the bottom, to know the differences of the ground.

DEER, see *Cervus*.

DE FACTO, something actually fact, in contradistinction to de jure, where a thing is only so in justice, as a king de facto is a person in possession of a crown, but without a legal right to the same; and a king de jure is he who has just right to the crown, though he is out of possession.

DEFEASANCE, in law, a condition relating to a deed; as to a recognizance or statute, which being performed by the recognizor, the deed is defeated, and made void, as if it had never been done.

DEFENCE, in fortification, all works that cover the opposite posts; as flanks, they are the parts: such is 8, its parts, 1, 2, 4, making only 7.

DEFILE, in fortification, a narrow passage, through which a company of horse and foot can pass only by making a small front; so that the enemy may take an opportunity to charge them with so much the more advantage, as those in the front and rear cannot reciprocally come to the relief of one another.

DEFINITION, in rhetoric, a short comprehensive explanation.

The special rules for a good definition are, 1. It must be adequate, that is, it must agree to all the particular species or individuals included under the same idea. 2. It must be proper, and peculiar to the thing defined. These rules being observed will always render a definition reciprocal with the thing defined, that is, the definition may be used in the place of it; or they may be mutually affirmed concerning each other. 3. A definition should be clear and plain; and it is a general rule that no word should be used which has any difficulty in it. 4. A definition should be short, and have no tautology in it, nor superfluous words. 5. Neither the thing defined, nor a synonymous name should make any part of the definition.

DEFOLIATION, in botany, the fall of the leaves; a term opposed to frondescentia, the annual renovation of the leaves, produced by the unfolding of the buds in spring. Most plants in cold and temperate climates shed their leaves every year; this happens in autumn, and is generally announced by the flowering of the common meadow saffron. The term is only applied to trees and shrubs; for herbs perish down to the root every year, losing stem, leaves and all.

DEFORCEMENT, in law, the casting any one out of his land, or a withholding of lands and tenements by force from the right owner.

DEGLUTITION, in medicine, the act of swallowing the food, performed by means of the tongue driving the aliment into the œsophagus, which, by the contraction of the sphincter, protrudes the contents downwards.

DEGRADATION, in painting, expresses the lessening the appearance of distant objects in a landscape, in the same manner as they would appear to an eye placed at that distance from them.

DEGRADED CROSS, in heraldry, a cross divided into steps at each end, diminishing as they ascend towards the centre, called by the French peronnee.

DEGREE, in geometry, a division of a circle. The circumference of every circle is supposed to be divided into three hundred and sixty parts, called degrees, each of which is divided into sixty other parts, called minutes, and each of these again into sixty seconds, and so on.

By this means no more degrees or parts are reckoned in the greatest circle than in the least; therefore if the same angle at the centre be subtended by two concentric arches, as many degrees are counted in the one as the other; for these two arches have the same proportion to their whole peripheries.

A degree of the meridian on the surface of the globe has been variously
mined.

Ptolemy fixes the degree at 68 an
third Arabic miles, counting 7 and
stadia to each. The Arabs, who m
computation of the diameter of the
by measuring the distance of two
under the same meridian, in the p
Sennaar, by order of Almamon, m
only 56 miles. Kepler, determini
diameter of the earth, by the dist
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man miles; but his method is inac
Snell, seeking the diameter of the
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of the equator, found the quantity o
gree by one method 57,064 Paris
or 342,384 feet; by another method
Paris toises, or 342,342 feet; the
between which two numbers Picard
by mensuration, from Amiens to Ma
the most certain; and he makes the
tity of a degree 57,060 toises, or
feet. However, Cassini, in 1700, re
the same labour; and measuring the
of 6 degrees 18 minutes from Paris
the meridian, to Collioure in R
lon, found the length of the degree
to 57,292 toises, or 343,752 Paris
amounting to 365,184 English feet.

With this account agrees nearly
our countryman Norwood, who,
1635, measured the distance bet
London and York, and found it
English feet; the difference of la
being 2 degrees 28 minutes, hence
termined the quantity of one degr
367,196 English feet, or 69 miles
yards.

Cassini, the son, completed the w
measuring the whole arc of the m
in 1718. For this purpose he divid
meridian of France into two arcs,
he measured separately. The sou
Paris to Collioure gave him 57,097
the other, from Paris to Dunkirk, 56
and the whole arc from Dunkirk to
lioure 57,060; the same as Picard's.

Messieurs Maupertuis, Clairaut,
mus, Monnier, and Outheir, were se
a northern expedition; and began
operations, assisted by M. Celsius, an
nent astronomer of Sweden, in Lap
in July 1736, and finished them by th
of May following. They obtained the
sure of that degree whose middle
was in lat. 66 deg. 20 min. north
found it 57,438 toises, when reduc
the level of the sea. About the
time another company of philoso
was sent to South America, viz. M
eurs Godin, Bouguer, and Condamine
France, to whom were joined don
Juan, and don Antonio de Ulloa, of S
They left Europe in 1735, and began
operations in the province of Quito, P
ru in October 1736, and finished
about eight years after. The Spanish
tlemen published a separate account
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meridian at the equator 56,768 toises.
Bouguer makes it 56,753 toises, whe
duced to the level of the sea, and
Condamine 56,749 toises.

M. La Caille, being at the Cape of Go
Hope in 1752, found the length of a deg
of the meridian in lat. 33 deg. 18 min

triangles, whose angles may be y observation, connected with a ose length may be taken by an rvey or otherwise; and then to the different altitudes of some e two extremities of that distance, ves the difference of latitude be- hem: then, as this difference of is to one degree, so is the measured the length of one degree of the n sought.

of longitude, is the space between meridians that make an angle with each other at the poles; the y or length of which is variable, ng to the latitude, being every s the cosine of the latitude; viz. osine of one lat. is to the cosine of, so is the length of a degree in the at. to that in the latter; and from orem is computed the following table length of a degree of longitude, ent latitudes, supposing the earth lobe.

able is computed on the supposi- t the degrees of the equator are those of the meridian at the me- itude of 45 deg. which length is ne fifteenth English miles.

gitude miles.	Deg. lat.	English miles.	Deg. lat.	English miles.
0.07	31	59.15	61	33.45
9.06	32	58.51	62	32.50
9.45	33	57.87	63	31.35
8.97	34	57.20	64	30.25
8.90	35	56.51	65	29.15
8.81	36	55.81	66	28. 6
8.82	37	55.10	67	26.9
8.42	38	54.42	68	25
8.31	39	53.62	69	24.7
8.15	40	52.85	70	23.6
7.95	41	52.0	71	22.47

with an enamel or white glazing, which gives it the appearance and neatness of porcelain. Some kinds of this enamelled pottery differ much from others, either in their sustaining sudden heat without breaking, or in the beauty and regularity of their forms, of their enamel, and of the painting with which they are ornamented. In general, the fine and beautiful enamelled ware, which approaches the nearest to porcelain in external appearance, is at the same time that which least resists a brisk fire. Again, those which sustain a sudden heat are coarse, and resemble common pottery. This kind of ware has its name from Delft in Holland where it is made in large quantities.

DELIMA, a genus of plants belonging to the polyandria monogynia class, with an elongated style; it has no flower-petals; the cup consists of five leaves; the fruit is a bivalve capsule, and contains two seeds. There is but one species.

DELIQUESCENCE, in chemistry, denotes the property possessed by certain bodies of attracting moisture from the air and thereby becoming liquid.

DELIQUIUM, in chemistry, the dissolution or melting of a salt or calx by suspending it in a damp place under ground.

DELPHINIUM, *dolphin flower*, or *lark-spur*, a genus of the trigynia order, in the polyandria class of plants, in the natural method ranking under the 26th order, multisiliquæ. There are 11 species; four are cultivated in gardens. Two are annuals, and two perennials; they are herbaceous plants of upright growth garnished with divided leaves, and terminated by spikes of pentapetalous flowers, of blue, red, white, or violet colours. One annual species, the consolida, is found wild in several parts of Britain, and grows in corn fields.

[illegible] tins, which they [illegible] out of the sand with [illegible]. Their bodies are thick [illegible] slender towards [illegible] colour of the porpess is generally [illegible], and the belly whitish; the porpesse is remarkable for the vast quantity of fat that surrounds the body, which yields a great quantity of excellent oil.

3. The orca, or grampus, is found from the length of 15 feet to that of 25. It is very thick in proportion to its length; one of 18 feet being in the thickest place 10 feet diameter. It is extremely voracious; and is said to be a great enemy to the whale, upon which it will fasten till the animal roars with pain. The nose is flat, and turns up at the end. There are 30 teeth in each jaw, the spout hole is in the top of the neck. The colour of the back is black, but on each shoulder is a large white spot; the sides marbled with black and white, the belly of a snowy whiteness. These fishes sometimes appear on our coasts, but are found in much greater numbers off the North Cape in Norway.

4. The leucas, called by the Germans and Russians "white fish." The body is oblong and slender. It is quite destitute of the dorsal fin. Its length is from 12 to 18 feet. It makes great use of its tail in swimming, bending that part under, and working it with such force as to dart along with the rapidity of an arrow. It is common in all the Arctic seas, and forms an article of commerce, being taken on account of its blubber.

DELPHINUS, in astronomy, a constellation of the northern hemisphere, whose stars in Ptolemy's and Tycho's catalogues are 10, and in Mr. Flamstead's 18.

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- $1\frac{1}{24}$
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DENTELLA, a genus of the monogynia order, in the pentandria class of plants. The calyx is a five-parted perianthium, with small subulated leaves; the stamina five short subulated filaments; the antheræ small; the pericarpium a globular bilocular capsule; the seeds egg-shaped. There is one species a native of New Caledonia.

DENTIFRICE, a remedy for the teeth, of which there are various kinds: generally, however, they are made of earthy substances mixed with alum. Those formed of acids are very pernicious.

DEODAND, in law, is a forfeiture of that thing or animal which occasions the death of a human being by mischance.

DEPARTURE, in navigation, is the easting or westing of a ship in respect of the meridian it sailed from; or it is the difference of longitude, east or west, between the present meridian the ship is under, and that where the last reckoning or observation was made.

DEPOT, any particular place in which military stores are deposited for the use of an army. Also a particular place at the tail of the trenches, out of the reach of the cannon; where the troops generally assemble who are ordered to attack the outworks.

DEPRESSION *of the pole*. When a person sails or travels towards the equator, he is said to depress the pole; because as many degrees as he approaches nearer the equator, so many degrees will the pole be nearer the horizon. This arises from the spherical figure of the earth. When a star is under the horizon, it is termed the depression of that star under the horizon. The altitude or depression of a star is an arch of the vertical intercepted between the horizon and the star.

DEPRESSION, or *dip of the visible horizon*, denotes its sinking or dipping below the true horizontal plane, by the observer's eye being raised above the surface of the sea; in consequence of which the observed altitude of an object is by so much too great.

The following table shews the depression or dip of the horizon of the sea for different heights of the eye.

Height of the eye.	Dip of the horizon.		Height of the eye.	Dip of the horizon.		Height of the eye.	Dip of the horizon.	
Feet.	'	"	Feet.	'	"	Feet.	'	"
1	0	57	13	3	26	26	4	52
2	1	21	14	3	34	28	5	3
3	1	39	15	3	42	30	5	14
4	1	55	16	3	49	35	5	39
5	2	8	17	3	56	40	6	2
6	2	20	18	4	3	45	6	24
7	2	31	19	4	10	50	6	44
8	2	42	20	4	16	60	7	23
9	2	52	21	4	22	70	7	59
10	3	1	22	4	28	80	8	32
11	3	10	23	4	34	90	9	3
12	3	18	24	4	40	100	9	33

[illegible] of a violet-blue colour, and the thorax covered with green hairs; the legs are black. The larva, as well as the perfect insect inhabits the bo[illegible] of dead animals.

4. The fuminatus is of a light-brown colour, except the eyes, which are black. The thorax is margined, and the insect has the whole carriage of a scarabæus.

5. The ferrugineus is the largest of the genus; its colour is a rusty iron, having many black spots upon the elytra, which give the insect a gloomy appearance.

DESCANT, in the old music, the art of composing in several parts. Descant is threefold, viz. plain, figurative, and double.

DESCENSION, in astronomy, is either right or oblique. Right descension is an arch of the equinoctial, intercepted between the next equinoctial point and the intersection of the meridian, passing through the centre of the object, at its setting, in a right sphere. Oblique descension is an arch of the equinoctial intercepted between the next equinoctial point and the horizon, passing through the centre of the object, at its setting, in an oblique sphere.

DESCENT, in general, is the tendency of a body from a higher to a lower place. Heavy bodies meeting with no resistance, descend with an uniformly accelerated motion.

Laws of descent of bodies. 1st, Heavy bodies, in an unresisting medium, fall with an uniformly accelerated motion. For it is the nature of all constant and uniform forces, such as that of gravity, at the same distance from the centre of the earth, to generate or produce equal additions of velocity in equal times. So that if in one second of time there is produced one de-

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[illegible] try, that which has a limited number of answers: as the following, viz. To describe an isosceles triangle on a given line, whose angle at the base shall be double that at the vertex. [illegible] two solutions, viz. [illegible] an isosceles triangle, whose area and perimeter are given.

DETINUE, in law, is a writ which lies where any man comes to goods or chattels either by delivery or by finding, and refuses to give them up; and it lies for the detaining, when the detaining was unlawful.

DETONATION, in chemistry, the noise and explosion which any substance makes upon the application of fire. It is also called fulmination.

DETRANCHE, in heraldry, a line bendwise, proceeding from the dexter side but not from the very angle, diagonally athwart the shield.

DEVASTAVIT, in law, is a writ which lies against executors, to oblige them to pay debts for simple contract, before debts on bonds, and specialties, or the like.

DEVISE, or *device*, in heraldry, painting, and sculpture, any emblem used to represent a certain family, person, action or quality, with a suitable motto applied in a figurative sense.

DEVISE, in law, the act whereby a person bequeaths his lands or tenements to another, by his last will and testament. The person who makes this act, is called the devisor, and he in whose favour the act is made, is termed the devisee.

DEVOURING, in heraldry, is when fishes are borne in an escutcheon in a feeding posture, for they swallow all the meat whole.

[illegible]

[illegible] seas[illegible], its nature and cause.

DIAGONAL, in geometry, a right line drawn across a quadrilateral figure, from one angle to another, by some called the diameter. It is demonstrable, 1. That every diagonal divides a parallelogram into two equal parts. 2. That two diagonals drawn in any parallelogram bisect each other. 3. A line passing through the middle point of the diagonal of a parallelogram, divides the figure into two equal parts. 4. That the diagonal of a square is incommensurable with one of its sides. 5. That the sum of the squares of the diagonals of every parallelogram is equal to the sum of the squares of the four sides.

DIAGRAM, in geometry, a scheme for explaining and demonstrating the properties of a figure, whether triangle, square, circle, &c.

DIAL, or sun-dial, is a plane, upon which lines are described so that the shadow of a wire, or of the upper edge of a plate stile, erected perpendicularly on the plane may shew the true time of the day. The edge of the plate by which this is found, is called the stile, which must be parallel to the earth's axis; and the line on which this plate is erected, is called the substile. The angle included between the substile and stile, is called the elevation, or height of the stile.

Those dials whose planes are parallel to the plane of the horizon, are called horizontal dials; and those dials whose planes are perpendicular to the plane of the horizon, vertical or erect dials.

Erect dials, whose planes front the north or south, are called erect north or south dials; and all other erect dials are called [illegible]

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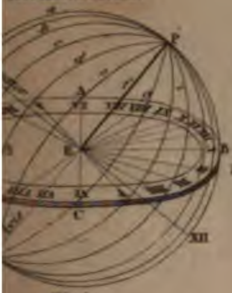


Fig. 1.

Vertical Dial.

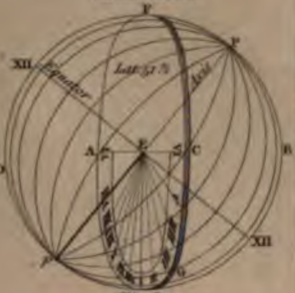


Fig. 2.

Horizontal Dial.

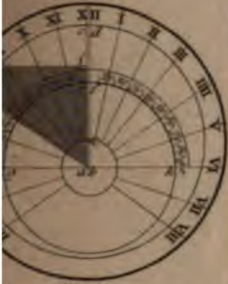
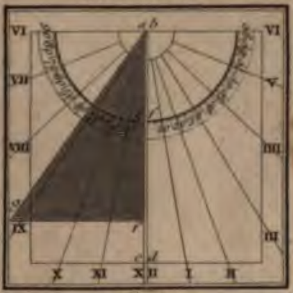


Fig. 3.

Erect South Dial.



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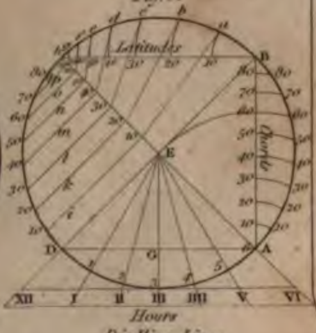

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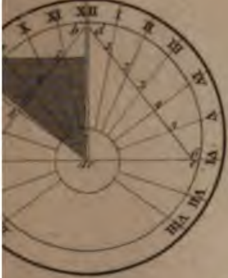

Fig. 5.

Cooper sculp.

Published Jan.y [illegible] by R. Phillips, Bridge Street, Blackfriars, London.

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the north point, where the
s supposed to be marked;
meridians will cut the ho-
spective distances of all
from XII. Then, if these
be marked on the hori-
globe be taken out of it,
ard put into its place,
e surface of the hori-
aight lines be drawn from
he board, to those points of
horizon which were cut
four meridian semicircles;
be the hour-lines of a ho-
that latitude, the edge of
must be in the same situa-
is of the globe was, before
ut of the horizon; that is
st make an angle with the
al equal to the latitude of
hich the dial is made.

he globe be elevated to the
e place, and any meridian
he north point of the hori-
the meridians will cut the
espective distances of all the
l, for a direct south dial,
must make an angle with
he dial, equal to the co-
place; and the hours must
trary way on this dial, to
n the horizontal.

lobe have more than twen-
n semicircles upon it, you
ollowing method.

a *horizontal dial.*—Elevate
latitude, and turn the globe
ar meridian (suppose the
the north point of the hori-

15, 30, 45, 60, 75, and 90 degrees of the equator eastward from the brazen meridian, you will find that these meridians of the globe cut the horizon in the following numbers of degrees from the north towards the east, viz. 11 two thirds, 24 and a quarter, 38 one twelfth, 53 and a half, 71 one fifteenth, and 90; the distances of the above hours from XII on the plane of the horizon.

To transfer these, and the rest of the hours, to a horizontal plane, draw the parallel right lines *a c* and *b d* (fig. 5) upon that plane, as far from each other as is equal to the thickness of the gnomon, and the space included between them will be the meridian or twelve-o'clock line on the dial. Cross this meridian at right angles with the six-o'clock line *g h*, and setting one foot of your compasses in the intersection *a*, as a centre, describe the quadrant *g e* with any convenient radius or opening of the compasses; then setting one foot in the intersection *b* as a centre with the same radius describe the quadrant *f h*, and divide each quadrant into ninety equal parts or degrees.

Because the hour-lines are less distant from each other about noon, than in any other part of the dial, it is best to have the centres of these quadrants at a little distance from the centre of the dial-plane, on the side opposite to XII, in order to enlarge the hour-distances thereabout under the same angles on the plane. Thus, the centre of the plane is at C, but the centres of the quadrant at *a* and *b*.

Lay a ruler over the point *b*; and keeping it there for the centre of all the afternoon hours in the quadrant *f h*; draw the hour-line of I through 11 degrees and two-thirds in the quadrant; the hour-line of II, tent, as a radius, describe the two quadrants upon their respective centres, the above distances may be taken with the compasses upon the line, and set off upon the quadrants.

To make an erect direct south dial.—Elevate the pole to the co-latitude, and proceed as above from VI in the morning to VI in the afternoon; only the hours must be reversed, as in figure 4, and the hypothenuse *a g*, of the gnomon *a g f*, must make an angle with the dial-plane equal to the co-latitude of the place. As the sun can shine no longer on this dial, than from six in the morning till six in the evening, there is no occasion for having any more than 12 hours upon it.

To make an erect dial, declining from the south towards the east or west.—Elevate the pole to the latitude, and screw the quadrant of altitude to the zenith. Then if the dial declines to the east (which we will suppose it to do) count in the horizon the degrees of declination, from the east point towards the north, and bring the lower end of the quadrant to that degree of declination at which the reckoning ends. Then bring any meridian of your globe under the graduated edge of the upper part of the brazen meridian, and set the hour-index to XII at noon, keeping the quadrant of altitude at the degree of declination in the horizon, turn the globe eastward, and observe the degrees cut by the first meridian in the quadrant of altitude (counted from the zenith) as the hour-index comes to XI, X, IX, &c. in the forenoon, or as 15, 30, 45, &c. degrees of the equator pass under the brazen meridian at these hours; and the degrees then cut in the quadrant by the first meridian, are the distances of the forenoon hours from XII on the plane of the dial. For the afternoon hours, turn

declines to the east: and
noon hour lines, when it
west; that is, to the left
twelve o'clock line in the
and to the right hand from

To find the distance of the
the twelve o'clock line.—If
clines from the south to the
degrees of that declination
from the east towards the
the lower end of the quadrant
to that degree of declination
reckoning ends; then turn
the first meridian cuts the
number of degrees, counted
point to the east; and the
first meridian will cross
right angles; and the number
of the quadrant intercepted
first meridian and the zenith,
the distance of the substile
twelve-o'clock line; and the
degrees of the *first meridian*,
between the quadrant and the
is equal to the elevation of the
the plane of the dial.

If the dial declines westw
south, count that declination
point of the horizon to the
the quadrant of altitude to
the horizon at which the reck
both for finding the forenoon
the distance of the substile fr
dian; and for the afternoon
the quadrant to the opposite
horizon, namely as far from
the north, and then proceed
as above.

Thus we have finished
dial: and in so doing, we
viz.

1. A north dial, declining
the same number of degree
dial, declining the same

laid down but every min
y single minute by those
hours is a foot long.
a double meridian line
the plane intended for
al, and crossed it at right
o'clock line *fe*, take the la-
ace with the compasses,
titudes, and set that ex-
nd from *a* to *f*, on the six-
n, taking the six hours
tsof the compasses in the
with that extent set one
, and let the other foot fall
n the meridian line *c d*, as
from *f* to *b*, and draw the
l *fb*, each of which will be
the whole scale of hours.
one foot of the compasses
of the scale at XII, and ex-
er to each hour on the
e extents from *d* to *e* for
urs, and from *b* to *f* for
oon, this will divide the
n the same manner as the
ided, at 1, 2, 3, 4, 5, and
quarters may also be laid
d. Then laying a ruler
raw the first five hours
from that point, through
meral figures 1, 2, 3, 4,
, and continue the lines
ugh the centre *c* to the
ial, for the like hours of
uch done, lay the ruler
and draw the last five
noon through the dots *b*,
line *fb*, continuing the
and VIII through the cen-
side of the dial, for the
e evening; and set the
pective lines as in the fi-

in the latitude of the place. 2. A line of latitudes, fitted to the hour-scale, and made by this canon; As the radius : the chord of 90 deg. :: the tangents of each respective degree of the line of latitudes : tangents of other arcs. And then the natural sines of those arches are the numbers, which taken from a diagonal scale of equal parts, shall graduate the divisions of the line of latitudes to any radius. The lines of hours and latitudes are general, for pricking down all dials with centres.

The other scales are particular, and give the several requisites for upright declining dials by inspection. They are, 1. A line of chords. 2. A line for the substile's distance from the meridian. 3. A line for the stile's height. 4. A line of the angle of 12 and 6. 5. A line of inclination of meridians.

DIALLING SPHERE, an instrument made of brass, with several semicircles sliding over each other on a moveable horizon, to demonstrate the nature of spherical triangles, and to give the true idea of drawing dials.

DIALIUM, a genus of the monogynia order, in the diandria class of plants. The corolla is pentapetalous; no calyx; the stamina at the upper side of the receptacle. There is one species, a tree of the East Indies.

DIALOGISM, in rhetoric, is used for the soliloquy of persons deliberating with themselves.

DIAMETER, in geometry, a right line passing through the centre of a circle, and terminated at each side by the circumference, which it divides into two equal parts. Hence we have a method of describing a semicircle upon any line, by-given logarithm .2839793 to .4600704 the third part of the logarithm 1.3802112 of 24, the sum .7440494 will be the logarithm of the diameter of a shot weighing 24 pounds, which is 5.5468 inches.

If the weight should be expressed by a fraction, the rule is the same: for instance the diameter of a pound and a half ball, or three seconds, is found by adding the logarithm .2839793 found above, to .0586971 one-third of the logarithm of two-thirds; the sum .3426764 will be the logarithm of the diameter required, *i. e.* 2.2013 inches.

DIAMOND, a precious stone, which when pure, is perfectly transparent. Its figure varies; but most commonly it is crystallized in the form of a six-sided prism. It is the hardest of all bodies, and the best tempered steel makes no impression on it. Diamond-powder can only be obtained by grinding one diamond against another. Its specific gravity is rather more than 3.5. It is a nonconductor of electricity.

Diamond-mines are found in Brazil in South America; and in Golconda, Visapour, Bengal, and the island of Borneo.

The diamond can only be cut and ground by itself and its own substance. To bring it to that perfection which augments its price so considerably, they begin by rubbing several against each other while rough, after having first glued them to the ends of two wooden blocks, thick enough to be held in the hand. It is this powder thus rubbed off the stones, and received in a little box for the purpose, that serves to grind and polish the stones. Diamonds are cut and polished by a mill, which turns a wheel of soft iron sprinkled over with diamond dust mixed with oil of olives. The same dust well ground and diluted with water and vinegar, is used in the sawing of diamonds; which is performed with an iron or brass wire, as fine as a hair. Sometimes, in lieu of sawing the diamonds, they cleave them, especially if there are any large shivers in them.

The first water in diamonds, means the greatest purity and perfection of their complexion, which ought to be that of the purest water. When diamonds fall short of this perfection, they are said to be of the second or third water, &c. till the stone may be properly called a coloured one; for it would be an impropriety to speak of an imperfectly coloured diamond, or one that has other defects, as a stone of a bad water only.

For the valuation of diamonds of all weights Mr. Jeffries lays down the following rule. He first supposes the value of a rough diamond to be settled at 2*l.* per carat at a medium; then to find the value of diamonds of greater weights, multiply the square of their weight by 2, and the product is the value required: *e. g.* To find the value of a rough diamond of two carats: 2 × 2 = 4, the square of the weight; which, multiplied by 2, gives 8*l.* the true value of a rough diamond of two carats. For finding the value of manufactured diamonds, he supposes half their weight to be lost in manufacturing them: *and therefore, to find their value, we must multiply the square of double their weight by 2, which will give their true value in*

pounds. Thus, to find the
wrought diamond weighing
we first find the square of
weight, viz. 4 × 4 = 16, then
So that the true value of a
mond of two carats is 32*l.*
ciples Mr. Jeffries has constr
of the price of diamonds
carats.

DIAMOND, *brilliant*, is that
in faces at the top and bottom
table, or principal face at top,

DIAMOND, *rose*, is one that
underneath, with its upper
many little faces, usually
uppermost of which terminate

DIAMOND, in the glass trade
ment used for squaring the la
pieces; and, among glaziers
their glass. The diamonds are
managed. That used for larg
looking glasses, is set in an
about two inches long, and
an inch in diameter; the cavi
rule being filled up with lead
diamond firm: there is also
box or ebony fitted to the
which it is held.

DIAMOND, in heraldry,
for expressing the black co
achievements of peerage.

DIANÆ ARBOR, or
Argentum Arborescens.

DIANDRIA, the name of the
in Linnæus's sexual system,
hermaphrodite plants, which
with two stamina or male or
ders in this class are three, de
number of styles or female
plants with two stamina have
jessamine, lilac, privet, vero
tard alaternus vernal grass
pepper, three.

DIANTHERA, in botany,
monogynia order, in the dia
plants, and in the natural m
under the 40th order, perso
rolla is ringent; the caps
parting with a spring at the
mina each furnished with
placed alternately. There

DIANTHUS, *clove-gilliflo*
pink, sweet-william, &c. a ge
gynia order, in the decandria
and in the natural method
the 22d order, caryophylle
is cylindrical and mono
four scales at the base.
petals, with narrow heels;
cylindrical and unilocular
30 species; but not more
have any considerable bea
flowers, each of which has

1. The caryophyllus, or cl
including all the varieties
It rises with short trailing
root, with long, narrow ever
and amid t them upright
stalks, from one to three fe
ing many side-shoots; al
well as the main stalk, are
large solitary flowers, hav
scales to the calyx, and
The varieties are numerous

2. The deltoides, or comm
with numerous short leafy
ing the root, in a tufted
ground with narrow lea

ots many erect flower-
out 6 to 15 inches high,
litary flowers of different
and double, and some-
riegated. This species is

ensis, Chinese or Indian
nual plant, with upright
ranching erect on every
inches high, having all
minated by solitary flow-
colours and variegations.
tus, or bearded dianthus,
ed sweet-william. This
leafy shoots, crowning the
close to the ground, with
evergreen leaves. The
ight and firm, branching
ee feet high, having all the
ain-stem crowned by nu-
in aggregate clusters of
s.

in music. By this term
eeks expressed the interval
and some musical instru-
ave a kind of rule or scale,
pason, by which they de-
easures of the pipes, or
heir instruments.

DIAPENTE, is the inter-
d of an octave and a fifth
elfth.

DIATESSARON, is the in-
nded of an octave and a
rd; an eleventh.

, in botany, a genus of the
nogynia class of plants. the
consists of one saucer-like
being cylindrical, and the
nts five obtuse and plane
fruit is a trilocular roundish
ning a great many roundish
is one species.

in the antient music, an in-
the second of the concords;
diatessaron, an octave call-
ern music a fifth.

or *Diapré*, in heraldry,
a field in planes like fret-
g the same with variety of

M, in anatomy, a large ro-
s membrane or skin, placed
n the trunk, and dividing
om the abdomen, whence
ters call it septum trans-

A, in medicine, is a disorder
of frequent evacuations by
often occasioned by a
erspiration, a cold in the
tances in the stomach, &c.

UM, in pharmacy, a com-
ed from scordium one of its
It is otherwise termed *con-
rii.*

, in physic, signifies the dila-
eart, auricles and arteries;
posed to the systole, or con-
same parts.

, in grammar, a figure in
reby a syllable naturally
long.

RON, *in music, a term ap-
ntient Greeks to that inter-
all a fourth; consisting of
lesser tone and one great-
e word is also used for* the four gospels, arranged after the manner of a harmony.

DIATONIC, a term applied by the antient Greeks to that of their three genera, which consisted, like the modern system of intervals, of major-tones and semitones. The diatonic genus has long since been considered as more natural than either the chromatic or enharmonic.

DIATONUM INTENSUM, or sharp diatonic, the name given by musical theorists to those proportions of the intervals proposed by Ptolemy.

DICERA, in botany, a genus of the polyandria monogynia class and order. The petals are four, ovate and trifid; nectarium four or five emarginate corpuscules; anthers two horned. There are two species, trees of New Zealand.

DICHONDRIA, a genus of the class and order of plants pentandria digynia. The calyx is five-leaved; corolla rotate, inferior; capsule dicoccous. There is one species, an herb of New Zealand.

DICKSONIA, in botany, a genus of the class and order cryptogamia filicis. There are two species, one of which is supposed to be the same with the baromets or Scythian lamb.

DICTAMNUS, *white dittany* or *fraxinella*, a genus of the monogynia order, in the decandria class of plants, and in the natural method ranking under the 26th order, multisiliquæ. The calyx is pentaphyllous; the petals are five and patulous: the filaments sprinkled with glandulous points; the capsules five, coalited. There are two species.

The dalbus, or fraxinella, has thick, penetrating, perennial roots, collected into a head at top, sending up erect stalks annually, two or three feet high, garnished with pinnated alternate leaves, of three or four pair of oblong stiff lobes, terminated by an odd one: and the stalks crowned by long, pyramidal, loose spikes of flowers, of white, red, and purple colours.

DIDELPHIS, *opossum*, a genus of quadrupeds of the order of feræ.

The opossums were long supposed to be peculiar to America: but later discoveries have evinced that several species, unknown to America, exist in other parts of the globe. The following are the most remarkable species:

1. Didelphis Virginiana, or Virginian opossum. This which seems to have been the first discovered in America, is about the size of a cat, but of a thicker form, owing to the length and upright growth of the fur. The general measure seems to be about one foot four inches from the nose to the tail, which is commonly about a foot or thirteen inches long. It has a long sharpened face, and wide mouth, armed with numerous teeth, the tail is blackish at its origin, and covered with longish hair; but from that part to the end it is naked and covered with a scaly skin, the divisions of which are marked in such a manner, as to give the tail very much the appearance of a whitish snake, and it is possessed of the power of coiling, like those of several monkeys, round any object. The colour of the animal is a dingy yellowish white; the legs blackish, the belly white, and its low-

[illegible]

The V[illegible] opossum, like all the other Am[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible], an 1 may easily be tamed, but [illegible] a disagreeable smell; its voice is a sort of grunting squeak; its pace in running is not swift, but it is very expert in climbing trees, and readily passes, by means of its clinging tail, from bough to bough. The female produces four or five at a birth, and has the power of closing the pouch so strongly as to make it extremely difficult to open it by the hand; nor will any torture compel the animal to loosen it.

2. Didelphis marsupialis, or Molucca opossum. This, which is a larger species than the former, is of a thinner or more slender habit, than the Virginian opossum, with the snout longer, and the mouth wider in proportion. Its colour is brown, the ears are moderately large, and somewhat longer in proportion than in the Virginian opossum, the tail nearly similar; but the superior size and thinner form both of body and limbs, together with its darker colour, sufficiently distinguish it from the former species. It is reckoned a delicate food.

3. Didelphis brachyura, or short tailed opossum. This is one of the smaller species, and is said seldom to exceed the length of five inches from nose to tail, and in general to be somewhat smaller than this, and the tail scarcely ever exceeds the length of two inches. Its colour is a reddish brown on the upper parts, and whitish beneath, it is destitute of an abdominal pouch, the young fastening themselves to the teats. The fur of this animal is soft and elegant. It is a native of South America.

4. Didelphis orientalis, [illegible]

[illegible]
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covere
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The

to spring to a consi-
The fur is extremely
is brown and white.
abdominal pouch in
semilunar form. The
d is remarkably large
attened form.
In this species the
d, hairy at the tip, heels
, naked, and thumb-

s of plants of the class
ia polygamia frustra-
spanding; receptacle
parts, which retain
chaffy. many-leaved.
cies, annuals of the

a genus of birds be-
of gallinæ. The bill
middle by two trans-
mandible is inflected
e face is bare behind
e species, the ineptus,
inæus; but other na-
d two more.
hooded dodo (ineptus,
arger than a swan, and
length. The bill is
ked at the end; the
ie, except the end of
e, which is yellowish
on the bend of it; the
lackish, the irides are
colour of the plum-
d the belly and thighs
ad is large, and seems
k hood or cowl. The
n a yellow ash-colour;
ch are yellowish are
on the rump. The
three before and one

[illegible] the [illegible] grounds; and that there is likewise found a grey stone: the lizard [illegible] young [illegible].

DIDYNAMIA, the name of the 14th class in Linnæus's sexual method, the [illegible] of plants with complete flowers, which have four stamina or male organs, two of which are long and two short.

DIESIS, the name given to the smallest interval used in the music of the ancient Greeks. In harmonic calculations, those are called dieses which are greater than a comma, and less than a semi-tone. Diesis in modern music, is the name given to the elevation of a note above its natural pitch.

DIFFERENCES, in heraldry, certain additaments to coat armour, whereby something is added or altered to distinguish younger families from the elder.

DIGASTRICUS, in anatomy, a muscle of the lower jaw, called also biventer.

DIGESTION, in medicine, is the dissolution of the aliments into such minute parts as are fit to enter the lacteal vessels, and circulate with the mass of blood.

The food is first conveyed to the stomach, where by means of the gastric juice it is converted into chyme. The chyme passes into the intestinal canal, where it is subjected to a new process, being gradually decomposed and converted into chyle and excrementitious matter, which by means of the bile are separated from each other. The excrementitious matter is evacuated, but the chyle is absorbed by the lacteals, and conveyed to the blood vessels by the lungs.

DIGESTOR, in chemistry, a vessel made of copper or iron, and fitted with a cover and screws, so as to remain perfectly tight in a strong heat, whilst water, common

DIGITALIS, *fox-glove*, a genus of the angiospermia order, in the didynamia class of plants, and in the natural method ranking under the 28th order, luridae. There are 12 species; [illegible] of which are herbaceous, biennial, and perennial plants. The herbaceous species rise two or three feet high, crowned with spikes of yellow iron-coloured or purple flowers. The canariensis or shrubby sort rises five or six feet high, having spear-shaped rough leaves, the branches being terminated with flowers growing in loose spikes. All the species are easily raised by seeds. An ointment made of the flowers of purple fox-glove and fresh butter, is commended by some surgeons for scrophulous ulcers. Taken internally, this plant is a purgative and emetic; and is therefore only to be administered to robust constitutions. An infusion of two drams of the leaf in a pint of water, given in half-ounce doses every two hours till it begins to vomit or purge, is recommended in dropsy, particularly that of the breast.

DIGITATED, among botanists, an appellation given to compound leaves, each of which is composed of a number of simple foliola, placed regularly on a common petiole.

DIGYNIA, the name of an order, or secondary division, in each of the first 13 classes except the 9th, in Linnæus's sexual method; consisting of plants, which to the classic character, whatever it is, add the circumstance of having two styles, or female organs.

DILAPIDATION, in ecclesiastical law, is where an incumbent on a church living suffers the parsonage house or outhouses to fall down, or be in decay, for want of necessary reparations.

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straight: the supe-
at the point, and
d; the nostrils are
, and placed on the
pecies, viz. 1. The
Edwards, 1 about
These birds are
ist the tropics and
Hope They are
st flocks in Kamt-
ent islands, about
e they are called
e voracious birds,
a salmon of four
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into the stomach at
d will often remain
the natives, find-
uation, make no
t on the head.
on the ground with
arger than that of
nale is sitting the
ne wing and sup-
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e wings, and the
nected by a mem-
e guin of Edwards.

[illegible]

and succulent; the upper joints consist of two lobes; of a semi-oval form, with the margins furnished with stiff hairs which lock in each other when they close: the upper surfaces of these lobes are covered with red glands; each of which appears, when highly magnified, like a compressed arbutus berry. The stalk is about six inches high, round, smooth, and without leaves; ending in a spike of flowers, milk-white, and standing on footstalks, at the bottom of which is a little painted bractea or flower-leaf.

DIOPHANTINE PROBLEMS, in mathematics, questions relating to square and cube numbers, and right-angled triangles, &c. the nature of which was determined by Diophantus, of Alexandria, who lived about the third century. In these questions it is endeavoured to find commensurable numbers to answer indeterminate problems; which bring out an infinite number of incommensurable quantities. For example, it is proposed to find a right-angled triangle, whose sides x, y, z, are expressed by commensurable numbers; it is known that $x^2+y^2=z^2$, z, being the supposed hypothenuse. But it is possible to assume x and y so, that z will be incommensurable; for if $x=1$, and $y=2$, $z=\sqrt{5}$. The art of resolving such problems consists in managing the unknown quantity or quantities in such a manner, [illegible]

[illegible] rough, unequal, covered with stringy fibres or filaments, and of a violet colour; the inside is white, and of the consistence of [illegible]. When raw, the yams are viscous and clammy: but when roasted or boiled, they afford a nourishing food, and are often preferred to bread by the inhabitants of the West Indies. The root commonly weighs two or three pounds, though some have weighed upwards of twenty.

DIOSMA, *African spiræa*, a genus of the monogynia order, in the pentandria class of plants; and in the natural method, ranking among the dubious. There are 19 species; of which the most remarkable are the hirsuta, with hairy leaves; and the oppositifolia, with leaves placed in the form of a cross. The first is a fine shrub, growing to the height of five or six feet: the stalks are of a coral colour, the leaves come out alternately on every side of the branches: the flowers which are white, are produced in clusters at the end of the shoots. They are succeeded by starry seed-vessels having five corners; in each of which is a cell, containing one black seed: these vessels abound with a resin which emits a grateful scent, as does the whole plant. The second species rises to the height of three or four feet: the branches are slender, and produced from the stem irregularly; the flowers are produced at the ends of the branches, between the leaves: the plants continue a long time in flower.

DIOSPYROS, the *Indian date-plum*; a genus of the diœcia order, in the polygamia class of plants; and in the natural method ranking under the 18th order, Bicornes. There are 9 species, the most remarkable are: 1. The lotus, which is supposed to be [illegible]

id to grow torpid for some
g on the change of weather.
Salus, or alagtaga, in its ge-
ance perfectly resembles the
arger. It is principally dis-
the remarkable character of
each of which has a pair of
tional toes, situated at some
e the front toes, and furnish-
s claws.
cies there are two supposed
eeing in form with the above
but differing in size, and in
t in colour; but the differ-
such as to justify our consi-
s specifically distinct. The
Varieties is the Middle Sibe-
which is of the size of a rat,
ight crossed by a white line;
one or circle surrounds the
r other is called by Mr. Pen-
tny Siberian jerboa. It agrees
he other, but has no white cir-
nose, and has a smaller tuft
t end of which is tipped with
e it is inferior to the middle
said to inhabit the same
the large or first-described
re supposed to sleep during
the manner of dormice.
fer, or cape jerboa, is larger
er, and is a native of the
country to the north of the
Hope. It is an animal of
and activity, and will spring
nce of 20 or 30 feet at once.
t sits upright in the manner

ridianus, or torrid jerboa,
r. Pallas, was first figured
specimen appears to have
grown. Specimens were
allas in the year 1770, which
the borders of the sandy
s, in 46 degrees 30 minutes
The burrows which they
he dry soil, had a triple en-
of this species is between
a field mouse.
Canadensis, or Canadian
a very minute species and
in Canada near Quebec by
who says, during the time
ained in its usual vigour,
incredible for so small a
always took progressive
ree to four, and sometimes
although seldom above 12
m the surface of the grass;
uently observed others in
, and in the woods, among
they chiefly reside, leap
gher. When found in such
ossible to take them, from
l agility, and their evading
bounding into the thickest
er they can find.
nus of the monogynia or-
ndria class of plants, and
method ranking under the
recula. There is one spe-
rub of North America.
astronomy, a term ap-
t when it appears to an ob-
arth to go *forward in the*
rding to the succession of

in optics, is a ray flow-

ing from a point of a visible object directly to the eye, through one and the same medium.

DIRECTION, in mechanics, signifies the line or path of a body's motion, along which it endeavours to proceed, according to the force impressed upon it.

DIRECTOR, in surgery, a probe to direct the edge of the knife or scissars, in opening sinuses, or fistulæ, to prevent the vessels, nerves, and tendons from being hurt.

DIRIGENT, or *Directrix*, a term in geometry, signifying the line of motion along which the describent line or surface is carried in the genesis of any plane or solid figure.

DISA, a genus of plants of the gynandria diandria class and order. The spathe is one-valved; petals three, the third less, two parted, gibbous at the base. There are four species, herbaceous plants of the Cape, with blue flowers.

DISANDRIA, a genus of the monogynia order, in the heptandria class of plants. The calyx has seven leaves, the corolla is parted into seven, and flat; capsule two-celled. There are two species, natives of Madeira.

DISC, in astronomy, the body and face of the sun and moon, such as it appears to us; or the body or face of the earth, as it appears to a spectator in the moon. The disc in eclipses is supposed to be divided into 12 equal parts, called digits; in a total eclipse of the luminaries the whole disc is obscured; in a partial eclipse, only a part of it.

DISC, in botany, is an aggregate of florets apparently forming a plane surface.

DISC, in optics, is the width of the aperture of telescopic glasses, whether plane, convex, concave, &c.

DISCORD, in music, is a dissonant or inharmonious combination of sounds, so called in opposition to concord, the effects of which the discord is calculated to relieve and sweeten.

DISCOUNT, among traders, a term used on occasion of their buying commodities on the usual time of credit, with a condition that the seller shall make an allowance to the buyer at the rate of so much per cent. per annum, for the time for which the credit is given, upon condition that the buyer pays ready money for such commodities, instead of taking the time of credit. Also a deduction from the full amount of a bill or note when cash is given for it before it is due. Traders and merchants also frequently taking promissory notes for money due, payable to them or order at a certain time, and sometimes having occasion for money before the time is elapsed, they procure these notes to be discounted by bankers or others before the time of payment; which discount is more or less, according to the credit and reputation of the person who drew the note, and the indorser or indorsers.

As the amount of 100l. for the given
rate and time:
Is to the given sum ::
So is the interest of 100l. for the given
rate and time:
To the discount of the debt.

DISCRETE, or *disjunct proportion*, is when the ratio of two or more pairs of numbers or quantities is the same, but there is not the same proportion between all the four numbers.

DISCRETE QUANTITY, such as is not continuous and joined together.

DISCUTIENTS, in surgery, are external remedies which dissolve or disperse a stagnated or coagulated fluid.

DISDIAPASON, or *bisdiapason*, in music, a compound concord, described by Parran, in the quadruple ratio of 4 : 1, or 8 : 2.

DISJUNCTIVE PROPOSITION, in logic, is that where of several predicates we affirm one necessarily to belong to the subject to the exclusion of all the rest, but leave that particular one undetermined.

DISLOCATION, the putting a bone out of joint, by violence.

DISMEMBERED, in heraldry, is applied to birds that have neither feet nor legs, and also to lions and other animals whose members are separated.

DISPART, in gunnery, is the setting a mark upon or about the muzzle-ring of a piece of ordnance, so that a sight-line taken upon the top of the base-ring against the touch-hole, by the mark set on or near the muzzle, may be parallel to the axis of the concave cylinder. The common way of doing this, is to take the two diameters of the base ring, and of the place where the dispart is to stand, and divide the difference between them, into two equal parts one which will be

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rit as it first comes over.
l into a quantity of cold

gral whole into its several parts.

DISTRINGAS, in law, a writ commanding the sheriff, or other officer, that he distrain a person for debt to the king, &c. or for his appearance at a certain day. There is a great diversity of this writ.

DITHYRAMBUS, in antient poetry, a hymn in honour of Bacchus, full of transport and poetical rage. Aristotle and Horace say, that the antients gave the name of dithyrambus to those verses in which none of the common rules or measures were observed.

DITONE, in music, an interval comprehending two tones. The proportion of the sounds that form the ditone is 4:5, and that of the semiditone is 5:6.

DIVER, in ornithology, see *Colymbus*.

DIVERGENT or *diverging lines*, in geometry, are those which constantly recede from each other.

DIVERGENT RAYS, in optics, are those which going from a point of the visible object, are dispersed, and continually depart one from another, in proportion as they are removed from the object, in which sense it is opposed to convergent.

DIVERSITY, in logic, stands in opposition to identity.

DIVERSITY, in painting, consists in giving every part or figure in a piece its proper air and attitude.

DIVIDEND, in arithmetic, the number proposed to be divided into equal parts. It must always be greater than the divisor.

DIVIDEND *of stocks*, is a share or proportion of the interest of stocks erected on public funds, as the South Sea, &c. divided among, and paid to, the proprietors half yearly.

[illegible] sitting, [illegible] sinks down with the included [illegible] and if the ca[illegible] a tun of [illegible] remain a full [illegible] without much inconvenience, at five or six fathoms deep. But the lower he goes, the included air contracts itself according to the weight of the water which compresses it; so that at 33 feet the bell becomes half full of water, the pressure of the incumbent water being equal to that of the atmosphere; and at all other depths the space occupied by the compressed air in the upper part of the bell will be the under part of its capacity filled with water, as 33 feet, to the surface of the water in the bell below the common surface. And thus condensed air being taken in with the breath soon accommodates itself to the existing circumstances so as to have no ill effect; provided the bell is permitted to descend slowly. But the greatest inconvenience of this engine is, that the water entering it contracts the bulk of air into so small a compass, that it soon heats, and becomes unfit for respiration; so that there is a necessity for its being drawn up to recruit it; besides the uncomfortable situation of the diver, who must be almost covered with water.

To obviate these difficulties of the diving bell, Dr. Halley contrived a farther apparatus, whereby not only to recruit the air from time to time, but also to keep the water wholly out of the machine at any depth. This bell was made of wood, containing about 60 cubic feet in its concavity; and was of the form of a truncated cone, whose diameter at the top was three feet, and at the bottom five. It was so loaded with lead, that it would

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rriage; the other a
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macy, such medi-
scharge of urine,
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ns in the urinary

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, moon, or stars,
r rising and set-

a planet, is so
tes as any planet
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e of an harbour,
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of the didynamia
order of plants

the calyx is half quinquefid, having the corolla above; the corolla quinquefid; the capsule unilocular, conjoined with the calyx. It is a shrub of Surinam.

DODECATHEON, a genus of the monogynia order, in the pentandria class of plants, and in the natural method ranking under the 21st order, preciæ. There is one species, the D. meadia, a native of Virginia.

DODO. See *Didus*.

DODONÆA, a genus of plants of the octandria monogynia class; having no corolla; the fruit is a roundish trilocular capsule, with prominent inflated angles, containing solitary seeds. There are two species.

DOG. See *Canis*.

DOLICHOS, a genus of the decandria order, in the diadelphia class of plants; and in the natural method ranking under the 32d order, papilionaceæ. There are 38 species, the most remarkable of which are, 1. The lablab, with a winding stalk, is a native of warm climates, and Hasselquist informs us, that it is cultivated in the Egyptian gardens, but is not a native of that country. The Egyptians make pleasant arbours with it in their houses and gardens, by supporting the stem and leading it where they think proper. 2. The soja, a native of Japan, grows with an erect, slender, and hairy stalk, to the height of about four feet. The leaves are like those of the garden kidney bean. The flowers are of a bluish white, and produced from the bosom of the leaves and succeeded by bristly hanging pods resembling those of the yellow lupin, which commonly contain two, sometimes three, large white seeds. There is a variety of this kind, with a small black fruit, which was once employed in medicine. Kempfer affirms, that the seeds of this give re-

[illegible] genus of the polyan[illegible] class and order. The ca[illegible] corolla three-petalled, [illegible] very globular, [illegible] style, one-celled, two [illegible] There are three species, shrubs of Guiana.

DOLPHIN. See *Delphinus.*

DOMBEYA, a genus of the class and order diœcia monodelphia. The male, calyx of the ament. scales; corolla none; anthers 10 or 12, without filaments. Female, calyx ament. with many germs; corolla none; stigma bivalve, unequal, seeds many, in a roundish strobile. There is one species, a tree of Chili.

DOMESDAY, a record, made in William the Conqueror's time, and now remaining in the exchequer, consisting of two volumes, containing a survey of all the lands in England. It was begun by five justices, assigned for that purpose in each county in 1081, and finished in 1086.

DOMINANT *of a mode*, in music, is that sound which makes a fifth to the final, or tone.

DOMINICAL LETTER, is that letter of the alphabet which points out in the calendar the Sundays throughout the year, thence also called Sunday-letter. See *Chronology.*

DONATIA, a genus of the trigynia order, in the triandria class of plants. There is only one species.

DONATION, an act whereby a person transfers to another either the property or the use of something, as a free gift. In order to be valid, it supposes a capacity both in the donor, and donee, and requires consent, acceptance, and delivery. Civilians distinguish donation into pure and conditional.

DONATIVE, in the

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r, in law, is where the de-
t alleges two several mat-
the plaintiff's action, when
ufficient.
in the military art, is put-
r files of soldiers into one.
, in carpentry, is the fas-
gether by letting one piece
the form of the tail of a
vetail is the strongest of
ause the tenon, or piece of
put into the other, goes
extreme, so that it cannot
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A, a genus of the class and
nia polyandria. There is
, a shrub of Guiana.
aw, the portion which a
the lands of her husband,
e, for the sustenance of
education of her children.
tas of the siliculosa order,
mia class of plants, and in
od ranking under the 39th
. There are nine spe-
the only one worthy of
a, or early whitlow-grass,
alks, with leaves a little
blossoms are white, and
ers hang down. It grows
d dry banks.
in angling, is a method of
. Take a strong line of six
fore you fasten to your rod,
rough a piece of lead, that
it may slip to and fro, and
may something move it on
ait with a lob-worm well
its motion the barbel may
hout suspicion. The best
unning waters near piles, or
bridges, supported with
d slimy.
lt-works, a kind of wooden
ng the salt when taken out
pan.
, a genus of the monogynia
hexandria class of plants.
pecies, most of them having
e palms, and one of them
hich is a magnificent plant,
affording a red powder, like
gon's-blood.
Grecian coin, of the value
n is also a weight containing
ee scruples, or the eighth
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dragon in zoology, a genus
e order of amphibia repti-
ters of which are these: it
cylindrical tail, and two
s wings, radiated like the
y which it is enabled to
ny great distance. There
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s, or flying dragon, with
rely distinct from the fore-
d in Africa and the East

with the wings fixed to the
a native of America. *They*
atures, and feed upon flies
nsects.
NS, in meteorology, a fi-
quent in marshy and cold

countries. It is most common in summer, and though principally seen playing near the banks of rivers, or in boggy places, yet sometimes it mounts to a considerable height in the air, to the no small terror of the amazed beholders: its appearance being that of an oblong, or roundish, fiery body, with a long tail but it does no injury.

DRACO, in astronomy, a constellation of stars in the northern hemisphere, containing according to Ptolemy, 31; to Tycho, 32; to Hevelius, 40; to Bayer, 33. and according to Mr Flamstead, 80.

DRACOCEPHALUM, dragon's head, a genus of the gymnospermia order, in the didynamia class of plants. There are 15 species most of them herbaceous, annual plants, from eighteen inches to three feet high, mostly with entire leaves, and spikes of small monopetalous flowers, of a blue, white, or purple colour. The Dracocephalum Canariense is well known by the name of balm of Gilead.

DRACONTIUM, *dragons*, a genus of the polyandria order, in the gynandria class of plants, and in the natural method ranking under the first order palmæ. There are five species all natives of the Indies. The only one which makes any appearance is the pentusum, with leaves having holes and a climbing stalk, this is a native of most of the West India islands,

DRACUNCULI, in medicine, small long worms, which breed in the muscular parts of the arms and legs, called Guinea-worms being common in Guinea, and principally among the natives. The worm is white, round, and uniform, resembling white round tape. It is lodged between the interstices and membranes of the muscles, where it insinuates itself, sometimes exceeding five ells in length. It occasions no great pain at the beginning; but at such times as it is ready to exit, the part adjoining to the extremity of the worm, where it attempts its exclusion, begins to swell, throb, and be inflamed: this generally happens about the ancle, leg, or thigh, and rarely higher.

The countries where this distemper is observed, are very hot and sultry, liable to great droughts, and the inhabitants make use of stagnating and corrupted water, in which it is very probable that the ova of these animalcula may be contained; for the white people who drink this water are obnoxious to the disease as well as the negroes.

DRAGON's *head and tail*, are the nodes of the planets, or the two points wherein the ecliptic is intersected by the orbits of the planets, particularly that of the moon; making with it angles of five degees and eighteen minutes. One of these looks northward, the moon beginning then to have northward latitude; and the other southward, where she commences south. Thus her deviation from the ecliptic seems (according to the fancy of some) to make a figure like that of a dragon, whose belly is where she has the greatest latitude; the intersection representing *the head and tail, from which resemblance the denomination arises.* It must be *observed that* these points abide not always *in one place*, but have a motion of their own in the zodiac and retrograde wise, [illegible] externally or internally. A solution of dragon's-blood in spirit of wine is used for staining marble, to which it gives a red tinge.

DRAGON-shell, in natural history, a name given by people curious in shells to a species of concamerated patella or limpet. This has a top very much bent, and is of an ash-colour on the outside, but of an elegant and bright flesh-colour within. It has been found sticking on the back of a tortoise, as the common limpets do on the sides of rocks, and some have been affixed to large shells of the pinna marina.

DRAGONNE'E, in heraldry: a lion dragonnée is where the upper half resembles a lion, or other beast, the other half going off like the hinder part of a dragon.

DRAGOON, in military affairs, a musqueteer mounted on horseback, who sometimes fights or marches on foot, as occasion requires.

DRAINING, the art of clearing wet and boggy lands of their superfluous moisture.

Land becomes charged with moisture from two causes: 1. From water collected in the higher grounds and filtering among the different beds of gravel and other porous materials, forming springs below, and flowing over the surface, or stagnating underneath it. 2. From rain or water lodging and becoming stagnant on the surface, from the clayey or impervious nature of the soil or superior stratum. The first of these causes bogs, swamps, and morasses, and is the most difficult to be remedied.

Springs are formed in the bowels of the earth, by water percolating through strata of a porous texture, and it continues to descend till it meets with a stratum of clay that intercepts it in its course; where

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breaking.

Indian rubber, or elastic gum, is a substance like leather, which has the useful property of erasing or defacing lines drawn with black-lead; it is therefore much used for this purpose.

Indian ink. This useful substance comes from China, where it is used for writing, which is there performed with a brush instead of a pen. It is a solid substance, of a brownish-black colour; and the composition is not known, but is conjectured to be the gall of a species of cuttle-fish. When ground with water on a clean tile or plate, it may be made lighter or darker, as required, by adding to it more or less water. The best Indian ink is always stamped with Chinese characters, breaks with a glossy fracture, and feels smooth, when rubbed against the teeth. An inferior kind is made in this country, but it may be easily known by its grittiness.

Hair-pencils are made of camel's hair, put into a goose or swan's quill. To choose these, moisten them a little, and if they come to a point without splitting, they are good; if not, they are not fit for drawing with.

Charcoal, is used for sketching the outlines of figures, in order to get the proportions, previous to making a drawing in chalk. The best charcoal for this purpose is that of the willow; it is cut into slips, and the strokes made with it may be rubbed out with a feather of goose or duck's wing.

Black-chalk, is a fossil substance, resembling slaty coal, which is cut into slips for drawing. It is generally used in an instrument called a port-crayon, which is made of steel or brass. It is much em-tions for the study of drawing, attention must be paid to the particular branch of this art, to which the student wishes to apply himself. If to architecture, machinery, plans, elevations, sections, &c. he must make himself perfectly acquainted with geometry and perspective. To these he must add a knowledge of the doctrine of the reflection of rays of light; that the forms and intensity of the various parts of the shadows of objects may be correctly given.

Having completed the outlines, Indian-Ink is used for shadowing, as it may be diluted with water, so as to be of any required darkness, and may be softened off, where the objects require it, with water only and a hair pencil. This branch of drawing we consider as a useful rather than an ornamental art. It should be learned by every person, as answering the same purposes with writing, but in a much more perfect manner, in those cases to which it is applicable. This is particularly striking in descriptions of apparatus, and machinery of every kind.

Drawing of flowers, fruits, &c.—This first advance in art is so easy as to require little else than strict attention to imitate the objects placed before the eye, observing well those particularities which give the character of each, and mark the distinctness of the species. In trees, care is to be taken that the oak, ash, elm, &c. may each have its proper trunk, boughs, and foliage, so that it shall be no more possible to mistake one tree for another in a drawing than in nature. Nothing is more prejudicial to the student's progress than a habit of indiscriminate forms, which, though they denote a tree in general, do not decide its species.

Drawing of beasts, birds, fishes, &c.—
student must not only stu-

dle-tint paper; and in that
chalk may be used for laying
A piece of soft charcoal may
of, for first slightly sketching
ral form, which must after
over and corrected with the
The false lines of the black
removed by the Indian ru
student must be as sparing
this, as it is more improving
to draw every thing correct
at once.

The shadows may be laid
ing parallel curve lines, acco
situation of the part, cross
sionally, and softening them
delicate lines.

All the parts of a human fi
posed of curved surfaces;
lines being admissible, but
should have a graceful turn
be taken that no lines cross
right angles, which give a
net-like appearance; neith
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fect; but it should be used
as it is better to execute the
clear and regular manner
Care should be taken no
lines harsh and hard, like
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mellow. On this account,
better to learn from than
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quire a dry and hard man
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with a pen all the lines in e
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hole figure. But
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engths of a nose.

ral, however, the hands are twice as long as they are broad, and each of their parts has its length, breadth and thickness. The nail upon the finger is about half the joint it is upon. The length of the foot is a sixth part of the height of a person; and the length is five-eighths more than the breadth. The length of the face and hands ought to be exactly equal, and makes but just the tenth part of a person's height.

Rules for drawing children. Some make a child to contain five measures of the head, viz. from the top of the head to the privities three, and in the thighs and legs two more; the breadth between the two shoulders the length of a head and a half; the breadth of the body above the navel the length of one head; and the breadth of the upper part of the thigh is the third part of two lengths of the head; the breadth of the knee is just the measure there is betwixt the eyes and the chin; the small of the leg and the brawn of the arm, are of the thickness of the neck.

As to the manner of proceeding in drawing the human figure, it is first requisite to mark the extent which you propose to give to it, both in height and breadth; next divide, agreeably to the general proportions; and having ascertained the place where each part is to be drawn, sketch the head, then the shoulders, then draw the trunk beginning with the arm-pits (leaving the arms till afterwards) and so down to the hips on both sides, being sure to observe exactly the breadth of the waist. When you have done this, then draw that leg which the body stands upon, and afterwards the other, which stands loose, then draw the arms, and last of all the hands.

Endeavour to form all the parts of your figure with truth, let there be an agree-

[illegible] the closer the garment fits the body the smaller must be the folds. 7. Folds well imagined give [illegible] to any kind of action, because their motion implies a motion in the acting member. 8. An artful complication of folds in a circular manner greatly helps the fore shortenings. 9. All folds consist only of two shades which you may turn with the garment at pleasure, shadowing the inner side deeper, and the outer more faintly 10. The shades in silk and fine linen are thick and small, requiring little folds, and a light shadow. 11. Observe the motion of the air or wind, in order to draw the loose apparel all flying one way; and draw that part of the garment that adheres closest to the body before you draw the looser part that flies off from it, lest, by drawing the loose part of the garment first, you mistake the position of the figure. 12. Rich ornaments, sometimes contribute to the beauty of draperies; but are below the dignity of heavenly figures; the grandeur of whose draperies ought rather to consist in the boldness and nobleness of the folds, than in the quality of the stuff, or the glitter of ornaments. 13. Light and flying draperies are proper only for figures in strong motion, or in the wind: but when in a calm place, and free from violent action, the draperies should be large and flowing.

Drawing of landscapes—Having made himself master of perspective, the student should copy some good drawings; and here it is of importance that what he copies should be very excellent; for it is an absurd notion, that indifferent drawings will do to begin with, or to bring the hand in, as it is termed; but the most likely effect these can produce, will be to [illegible]

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silver, &c. Let the cause of the reflection, be it more or less, be seen in the thing itself. Place all your lights one way through the whole work, and if the light falls sideways on the picture, the other side, which is the farthest from the light, must be made the darkest. That part of the body must be made lightest which has the light most opposite to it; if the light be placed above the head, then the top of the head must be made lightest; the shoulder must receive the next greater degree of light; and thus must you continue to shade, losing the light by degrees. By how much one part of the body projects more than another, it must by so much be made the lighter: and, on the contrary, those parts that bend inward must be made so much the darker. Two equal lights must never be made in one and the same picture; the greater is to strike forcibly into the middle, and with greatest lustre on those parts of the design where the principal figures and strength of the action seem to lie, diminishing it gradually as it approaches nearest the extremities of the piece.

Particular directions. In drawing after a picture or print, place it in such a light that the gloss of the colours may not interrupt your view, but so that the light and your eye may fall equally and obliquely on the piece. Let it be placed at such a distance, that you may view it all at once: and the larger the picture is, it should be placed at the greater distance; but right before you and a little reclined.

Draw all your outlines at first faint with in the first and rudest draught of the piece; correct and amend what appears amiss; adding and diminishing as it varies from the pattern.

Of drawing faces.—In drawing a head, it is usually divided into four equal parts: 1. From the crown of the head to the top of the forehead 2. From the top of the forehead to the eyebrows. 3. From the eyebrows to the bottom of the nose. 4. From hence to the bottom of the chin. But this proportion is not constant; those features, in different men, being very often different as to length and shape. In a well proportioned face, however, they are nearly right.

Touch the features lightly, where the eyes, nose, mouth, and chin, should stand: then begin to draw them more exactly, and so proceed till you have finished the face; after which draw the hair, beard, and shadows about it. You are to consider all those chief touches which give life to a face, and that discover the disposition of the mind: thus the mouth extended, and the corners turning a little up, shews a smiling countenance, &c. You must take care that the shadows are not made too dark where they should be light, because afterwards they cannot be rendered more light;

Of drawing mixed figures.—In order to draw the form of any beast, or bird, you must be well acquainted, with its shape and actions, and whatever beast you draw, give a sketch of the landscape of the country natural to it.

In drawing birds, beginning at the head, the feathers must fall backwards one way in five ranks, still increasing till finished.

Insects, as flies, bees, wasps, grasshoppers, worms, and such-like, are drawn with great ease provided you have the originals before your eyes.

In drawing a flower begin from the rose-tuft, or wart in the middle, as in a rose or marigold with the yellow tuft; which being made, draw lines equally divided from thence to the greatest compass or extent of the flower. They may be drawn either fully open or in the bud; the leaves may be first drawn rudely, afterwards giving them their veins, or jaggedness.

Of drawing landscapes, buildings, &c.—All true drawing consists in nicely measuring the distances of each part of your piece by the eye. In order to facilitate this, you are to imagine in your mind that the piece you copy is divided into squares, as for example, suppose or imagine a perpendicular and a horizontal line crossing each other in the centre of the picture you are to copy: then suppose two such lines crossing your copy. Observe in the original what parts of the design those lines intersect, and let them fall on the same parts of the supposed lines in your copy. If you are to draw a landscape from nature, take your station on a rising ground, where you may have a large horizon, and mark your tablet into three divisions downwards, from the top to the bottom; and divide in your own mind the landscape you are to take into three divisions also. Then turn your face opposite to the middle of the horizontal line, and draw what is before your eyes upon

the middle division of
turn your head, but not
left hand, and delineate
there, joining it properly
done before. Lastly,
what is to be seen on
down every thing exactly,
spect to distance and
the nearest objects
highest, and those that are
shoot away lower and lower,
almost level with the line of
lessening every thing
its distance, and observing
your objects fainter and
farther they are removed
Make all your lights and
way; and let every thing
motion.

Of mechanical means for
ings.—There are various
which those who are ignorant
drawing may copy the
tures, and these methods are
to those who can draw, and
when expedition or accuracy

Tracing against the light.—
drawing you wish to copy
the panes of the window,
of glass put in a frame,
a music stand, with a candle
Lay your paper over the
you will see all the lines
distinctly through it, by which
can trace them with a pen, or
pencil.

To make tracing paper.—Mix
of oil of turpentine and
with a rag rub evenly over
paper. Hang it to dry
and it will be fit for use. La
the print you want to copy,
see every line so that you can
with the black-lead pencil.

Stencilling.—Lay the print over
of paper, and with a pin or
all the outline over with hol
take the clean paper with the
and lay it upon the paper
have the design transferred to,
over with the powder of char
dust will penetrate through the
leave a correct copy of the
the paper.

This is very useful for ladies
flowers upon muslin.

The method of enlarging and
by squares.—Divide the sides of
ginal into any number of equal
rule lines across with a black
from side to side, and from
tom. Then having your paper
you intend, divide it into the
ber of squares, either larger
you would enlarge or contract
placing your original before
square by square, the several
serving to make the part of the
are drawing fall into the same
square in the copy as in the orig
prevent mistakes, number the
both of the original and copy.
thod is used by engravers.

To prevent the necessity of rul
the original, which in some
injure it, take a square
glass, and divide its sides,
and bottom, into equal

rilliancy of light and
so very desirable.
h you intend to draw
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r design, the colours
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Vhen the tints are got
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gin to strengthen the
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ead and gamboge,
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remote part of the
imself drawing, we
s amusement, some

and laying the paper underneath it with the black side downwards, upon another piece of white paper of the same size, pin the three together in two or three places: afterwards, take a pen or needle, blunted at the point, and trace it over the outlines of your picture, which, with a little pressing, will direct the black paper to impress the white, so as to receive every stroke you draw; this done, you may correct what errors you see with a black-lead pencil, cleaning the new-made draught with stale bread.

2. Another way is, by taking a thin piece of paper, and holding it against a glass-window; then draw what you see from the glass, and afterwards the black lead paper is to be used as directed before.

3. Another way is by the use of a camera-obscura.

This is a machine wherein the images of external objects are represented distinctly, and in their genuine colours, either in an inverted or erect situation. It may be made as follows: Darken a chamber, one of whose windows looks into a place set with a variety of objects, leaving only one aperture open in the window. In this fit a lens, either a plane convex one, or one convex on both sides. At a due distance, to be determined by experience, spread a paper or white cloth on the wall, and on this the images of the desired objects will appear inverted.

In this case it is not more difficult to draw or rather copy the objects, though they are reversed, than to draw or copy several things which we see upright on the frames of transparent paper, lawn, or tiffany; for to trace lines will be as easily done one way as the other; and though [illegible] colours, whereby [illegible] of accuracy [illegible]

[illegible] Drawings, &c.

To take a drawing with fixed ink.—Take a thin sheet of paper, and rub it over with fresh butter, as equally as possible, then dry it by the fire, and rub the buttered side with carmine, lamp-black, black-lead powder, or blue bice, till it is all equally coloured; taking care that the colours will not come off by a slight touch with the finger. Then lay the coloured side upon a piece of clean paper, and lay the print you design to copy upon the buttered paper, afterwards with a fine pin or needle, blunted a little at the point, trace the outlines of the drawing carefully, by which means you will have a good copy of it upon your white paper;

To take the impression with red ink.—Mix vermilion finely ground with linseed oil, so that it be liquid enough to flow in a pen. With this trace the lines of your print; and then with a spunge dipt in water wet the back side of the print, and turn the printed side down upon a piece of white paper, so as to lie smooth: then lay over that a piece of dry paper, and press it hard in every part; and the lower white paper will receive the impression.

To take draughts, writings, &c. with red love ink.—Take some vermilion finely ground, and mix it with fair water in a gallipot with some cotton in it, so that it may run free in the pen: with this mixture draw over all the strokes of your print imitating the finer and stronger lines; then with a spunge dipt in gum-water wet a piece of white paper, and while it is wet turn the print upon it; and pressing it

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most weather, the patient a mattress or bed, [illegible] year, or [illegible] om; in warm and sultry bed only. The [illegible] apped as expeditiously as . blanket, and [illegible] m coarse cloths or flan-

r or sultry weather [illegible] ot be admitted. [illegible] be necessary to set open d doors.

than six persons are to be ply the proper means; a r will be useless, and may toration of life, by render e apartment unwholesome. roper for one of the as common pair of bellows pe a little up one nostril, ce, to introduce air into the same time the other mouth are to be closed by at, while a third person ne chest with his hands, are inflated. If the pipe too large, the air may be mouth, the nostrils being may not escape that way. ly be gently rubbed with led with spirits. A war l (the body being surroun l) may be lightly moved e back. Fomentations of o be applied to the pit of ns, &c. and often renew led with hot water, hea ed with flannel, or hot applied to the soles of the [illegible] are to be much agitated, nor taken [illegible] of their legs and arms [illegible] gently [illegible] time.

[illegible] any signs of returning [illegible] warm liquid [illegible] swallowing can be perceived, a [illegible] of warm [illegible] wine may be given in small quantities and frequently repeated.

[illegible] Electricity may be tried by the skilful. Its application neither prevents nor retards the various modes of recovery already recommended; but, on the other hand, it will most probably tend to render the other means employed more expeditiously efficacious.

The methods which have been described are to be employed with vigour for three hours or upwards, although no favourable circumstance [illegible]; for it is a dangerous error to suppose that persons are irrecoverable because life does not soon make its appearance. Bleeding is never to be employed unless by direction of a medical person.

DRUG, among fan-makers, is a composition of gum arabic, and other ingredients, used in laying gold or silver on [illegible] fans, or in covering them with either of these metals in powder. They use it also to paste together the papers, gauzes, taffetas, and other matters [illegible].

DRUGS [illegible] glass, used by some in bleaching [illegible].

DRUGGET, in commerce, a cloth sometimes all wool, and sometimes half wool half thread, it is either corded or plain.

DRUM, a martial musical instrument in form of a cylinder, hollow within, and covered at the two ends with vellum, which is stretched or slackened at pleasure by small cords and sliding knots. Some

DUCT, *ductus*, in general, denotes any tube or canal.

DUCTILITY, in physics, a property of certain bodies, whereby they are capable of being expanded.

The great ductility of some bodies, especially gold, is surprising: the goldbeaters and wiredrawers reduce gold into lamellæ inconceivably thin, yet without the least aperture or pore being discoverable, even by the microscope; a single grain of gold may be stretched under the hammer, into a leaf that will cover a house, and yet the leaf remain so compact as not to transmit the rays of light. Dr. Halley took the following method to compute the ductility of gold; he learned from the wiredrawers, that an ounce of gold is sufficient to gild a silver cylinder of 48 ounces weight, which cylinder may be drawn out in a wire so fine, that two yards shall weigh only one grain; and consequently 98 yards of the same wire, only 49 grains; so that a single grain of gold gilds 98 yards; and, of course, the ten-thousandth part of a grain is above one-third of an inch long. And since the third part of an inch is capable of being divided into ten lesser parts visible to the naked eye, it is evident that the hundred-thousandth part of a grain of gold may be seen without the assistance of a microscope. Proceeding in his calculation he found that a cube of gold, whose side is the hundredth part of an inch, contains 2,433,000,000 visible parts, and yet, though the gold with which such wire is coated, is stretched to such a degree, so intimately do its parts cohere, that there is not any appearance of the colour of the silver.

Mr. Boyle, examining some leaf-gold, found that a grain and a quarter in weight took up an area of fifty square inches; supposing therefore the leaf divided by pa-

ed it, a second opera
hook to the metal thus in
withdrawing the hook sta
with it a thread of glass, whi
heres to the mass: then,
on the circumference of a
two feet and a half in diamet
the wheel as fast as he plea
drawing out the thread, whi
rim; till, after a certain numb
lu-ions, it is covered with a sk
thread.

DUETT, in music, a comp
ten for two voices or instrum
without a bass and accompan

DULCIMER, a musical
strung with about fifty wire
bridge at each end. It is
upon by striking the wires wi
rods.

DULEDGE, in gunnery, a
which joins the ends of the
form the round of a wheel
riage.

DUMBNESS, the privation
of speech. The most gener
dumbness, is the want of
hearing; language being ac
quired by imitating sounds.
source of intelligence deaf pe
tirely excluded; they cannot
ticulate sounds by the ear;
fore articulation can be
by some other medium, the
deprived of the use of la
late years, it has been shewn,
deaf people cannot learn to
by the direction of the ear, the
sources of imitation, by whi
effect may be produced. Th
hearing and speech have litt
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generally possess the latter in
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is about twelve fingers

mathematicians, de-
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2 to 1.
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writing, or account. It
cond letter written and
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portion, is a compound
s, the duplicate ratio of
io of *a a* to *b b*, or of the
quare of *b*.
ometrical proportionals,
e third is said to be in a
the first to the second:
&c. the ratio of 2 to 8 is
f 2 to 4, or as the square
of 4. Duplicate ratio
oportion of squares, as
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compounded of that of
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, in general, signifies
ny thing or multiplying
he folding of any thing
f.
E, among anatomists, a
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itoneum, &c.
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h surround the brain.
music, a term properly
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sesses the proper colour. Recourse can seldom be had to the first method, because it is hardly possible to produce a chemical change in the fibres of cloth, without spoiling its texture. The dyer, therefore when he wishes to give a new colour to cloth, has always recourse to the second method.

The substances employed for this purpose are called dye-stuffs, and are for the most part extracted from animal and vegetable substances.

If the colouring matters were merely spread over the surface of the fibres of cloth the colours produced might be bright, but they could not be permanent, because the colouring matter would disappear whenever the cloth was washed or exposed to the weather. The colouring matter then, is of no value, unless it adheres firmly to the cloth. Now this can only happen, when there is a strong affinity between the colouring matter and the cloth, and when they are combined together.

Dyeing then is a chemical process, and consists in combining a colouring matter with fibres of cloth. This process cannot be performed, unless the dye-stuff is first reduced to its integrant particles; for the attraction of aggregation between the particles of dye-stuffs, is too great to be overcome by the affinity between them and the cloth, unless they could be brought within smaller distances than is possible while they remain in a solid form. It is necessary, previously to dissolve the colouring matter in some liquid which has a weaker affinity for it than the cloth. When the cloth is dipped into this solution, the colouring matter, reduced to a liquid state, is brought within the attracting distance; the cloth therefore from its stronger affinity, takes it from the solvent, and fixes which, combining with the cloth, serves to [illegible] permanence of the dye. Substances employed for this purpose are denominated mordants, the proper choice of which [illegible] the most important part of dyeing. These must be dissolved in some liquid, which has a weaker affinity for them than the cloth has; and the cloth must be steeped in this solution to saturate itself with the mordant.

Almost the only substances used as mordants, are earths, metallic oxides, tan, and oil.

Of earths the principal is alumina; which is used either in the state of common alum, in which it is combined with sulphuric acid, or in that of acetite of alumina.

Alum is dissolved in water, and frequently a quantity of tartar is dissolved with it. Into this solution the cloth is put, and kept till it has absorbed as much alumina as is necessary. It is then taken out, washed and dried. The tartar serves two purposes; the potash which it contains, combines with the sulphuric acid of the alum, and thus prevents it from injuring the texture of the cloth, the tartareous acid combines with part of the alumina, and forms a tartrite of alumina, which is more easily decomposed by the cloth than alum.

Acetite of alumina is prepared by pouring acetite of lead into a solution of alum, a double decomposition takes place, the sulphureous acid combines with the lead, and the compound precipitates in the form of an insoluble powder, while the alumina combines with the acetous acid, and remains dissolved in the liquid. This mordant is employed for cotton and linen. Lime is sometimes used as a mor- [illegible] is used as a mor [illegible] is sometimes [illegible] cloth, but [illegible] converted into the [illegible] strong affinity for [illegible] mordant, it is used in two [illegible] of sulphate of iron, copperas [illegible] of iron. The first is commonl wool. The salt is dissolved in the cloth dipped in it. It m also for cotton, but in most case iron is preferred. It is prepar solving iron, or its oxide, i sour beer, &c. and the longer the better.

Tan has a strong affinity for several colouring matters; it is frequently employed as a mor infusion of nut-galls, or soma other substance containing tan in water, and the cloth is dip infusion, and allowed to rema absorbed a sufficient quantity. is capable of absorbing a grea tion of tan, and by that mean a great increase of weight. M [illegible] sometimes employ this increasing the weight of silk

Tan is often employed with dants to produce a compou also used for the same purp dying of cotton and linen. The with which tan is most freq bined, are alumina, and oxide

Besides these there are sev substances used as auxiliari tate the combination of the m the cloth, or to alter the shade the chief of these are, tartar, ace common salt, sal ammoniac, acetite of copper, &c.

Mordants not only render th

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n dyeing wool and

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ours. Cotton, therefore, when it is to be dyed yellow, is always prepared by combining some mordant with the weld. The most common of these mordants is alumina. Oxide of tin is sometimes used when fine yellows are wanted. It is often employed as an auxiliary to alumina, and to fix it more completely on cotton and linen. Tartar is also used as an auxiliary, to brighten the colour; and muriate of soda, sulphate of lime, and even sulphate of iron, to render the shade deeper.

The yellow given by fustic is more permanent, but not so beautiful as that given by weld, or quercitron. As it is permanent, and not much injured by acids, it is often used in compound colours, where a yellow is required. The mordant is alum. When the mordant is oxide of iron, fustic dyes a good drab colour.

Weld and quercitron bark yield nearly the same kind of colour, but as the bark yields colouring matter in greater abundance, it is more convenient and cheaper than weld.

Wool may be dyed yellow by the following process. Let it be boiled for an hour or more with about one sixth of its weight of alum, dissolved in a sufficient quantity of water. It is then to be plunged into a bath of warm water, containing as much quercitron bark, as equals the weight of the alum employed as a mordant. The cloth is to be turned through the boiling liquid, till it has acquired the intended colour. Then a quantity of clean powdered chalk, equal to the hundredth part of the weight of the cloth, is to be stirred in, and the operation of dyeing continued for eight or ten minutes longer.

alumina may be repeated; and if the shade of yellow is required to be bright and durable, the alternate wetting with lime-water and soaking in the mordant may be repeated three or four times.

Of dyeing red.—The colouring matters employed for dyeing red, are kermes, cochineal, archil, madder, carthamus, and Brazil wood.

The mordants are alumina and oxide of tin; oil, and tan, in certain processes, and tartar, and muriate of soda, are frequently used as auxiliaries.

Coarse woollen stuffs are dyed red with madder or archil; but fine cloth is almost exclusively dyed with cochineal, though the colour which it receives from kermes is more durable. Brazil-wood is scarcely used, except as an auxiliary, because the colour which it imparts to wool is not permanent.

Wool is dyed crimson, by impregnating it with alumina, in an alum bath, and then boiling it in a decoction of cochineal, &c. The crimson will be finer if the tin mordant is substituted for alum; indeed, it is usual with dyers to add a little nitro-muriate of tin, when they want fine crimsons.

Wool may be dyed scarlet, by boiling it in a solution of murio-sulphate of tin, then dyeing it pale yellow with quercitron bark, and afterwards crimson with cochineal.

Silk is usually dyed red with cochineal or carthamus, and sometimes with Brazil-wood. Kermes does not answer for silk; madder is scarcely ever used for that purpose, because it does not yield a colour bright enough. Archil is employed to give silk a bloom; but it is scarcely used by itself, unless when the colour wanted is lilac.

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English green.
nd red.—These form
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Silk is first dyed
f cochineal, and then
o vat. Cotton and li-
ue, then galled, and
of logwood; but a
ur is given by oxide

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on cloth, the colour
be dyed orange, by
then yellow. When
adder, the result is

e by carthamus; a
gwood, Brazil wood,
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ceive a cinnamon-
weld and madder;
, by being passed
v, and then a mad-

with other colours.—
, drabs, and browns.
ly combined with
and afterwards dyed
n bark, the result

DYSPNŒA, a difficulty of breathing, usually called asthma.

DYSURY, in medicine, a difficulty of making urine, attended with a sensation of heat and pain.

DYTISCUS, *the water-beetle*, in zoology, a genus of insects of the order of coleoptera. There are 23 species, distinguished by their antennæ, the various colours of the elytra, &c. The larvæ are often met with in water. They are oblong, and have six scaly feet. The body consists of eleven segments. The head is large, with four filiform antennæ, and a strong pair of jaws. The last segments of the body have rows of hairs on the sides; and the abdomen is terminated by two spines. The larvæ are frequently of a greenish variegated brown: they are lively, and extremely voracious: devouring other water-insects and even each other. The perfect insect is little inferior to its larvæ in voraciousness, but it can only exercise its cruelty on the larvæ, the perfect insects, like himself, being sheltered by a scaly cuirass. This creature must be touched cautiously; for, besides its power of giving a severe gripe with its jaws, it has a long sharp spine, which it drives into the fingers. The eggs of the dytisci are large, and inclosed in a silky darkish cod.

The perfect insects are common in stagnated waters which they quit in the evening to fly about. They swim with great agility, making use of their hinder legs as oars.

[illegible] minutes and [illegible] seconds every day. Now, [illegible] pendulums, and certain the [illegible] of Cayenne were not sufficient to solve this phaenomenon, which can flow only from a diminution in the pressure of gravity. For, as the earth revolves about its axis, all its parts will endeavour to recede from the axis of motion, and the equatorial parts where the motion is quickest will tend less towards the centre than the rest; their endeavour to fly off from the axis about which they revolve, taking off part of their tendency that way; so that those parts will become lighter than such as are nearer the poles. The polar parts, therefore, will press to the centre, and raise the equatorial parts, till the quantity of matter in the latter is increased so as to compensate for its lightness, and an equilibrium is restored; on which account, the form of the earth will be that of an oblate spheroid, whose shorter axis passes through the poles. By virtue of the rotation of the earth about its axis, the weight of bodies at the equator is less than at the poles, in the proportion of 288 to 289. Hence arises a spheroidical form of the earth; and from that proceeds another diminution of gravity at the equator, by which, if the earth was homogeneous throughout, bodies at the equator would lose one pound in 1121; and therefore the gravity of bodies at the poles would be to the same at the equator as 230 to 229. Whence, if we suppose the gravity of bodies within the earth to be directly as their distance from the centre, these numbers will express the relation between its polar and equatorial diameter.

The proportion of the two [illegible]

8. Zirconia.
9. Silica.

native plant of this
here are two species,
[illegible], or great
Laxusium or common
They are perennial
pastures, orchards, and
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ourse of rivers, &c.
ell as volcanic erup-
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a. Previous to the
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About an hour after
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off at sea, received so
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In 1631 and 1698,
ng water flowed from
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perished, 1755. This earthquake extended to Spain, Morocco, [illegible] France and England. The year [illegible] was rendered remarkable by the destruction of the two Calabrias and adjacent country, which was only the beginning of a series of dreadful earthquakes which continued to spread desolation over that part of the world for the space of two years.

EASTER, a festival of the Christian church, observed in memory of our Saviour's resurrection.

The Asiatic churches kept their Easter on the same day the Jews observed their passover, and others on the first Sunday after the first full moon in the new year. This controversy was determined in the council of Nice, when it was ordained that Easter should be kept upon one and the same day, which should always be a Sunday. But though the Christian churches differed as to the time of celebrating Easter, all agreed in shewing particular respect to this festival. See *Chronology*.

EAU-DE-LUCE, a volatile preparation which is thus made; ten or twelve grains of white soap are dissolved in four ounces of rectified spirit of wine, after which the solution is strained and a dram of rectified oil of amber is added and the whole is filtrated. Afterwards some strong volatile spirit of sal ammoniac should be mixed with the solution.

EBENUS, the *ebony-tree*, a genus of the decandria order, in the diadelphia class of plants, and in the natural method ranking under the 32d order, papilionaceæ. There are two species.

The cretica is a native of Crete, and other islands in the Archipelago. It rises with a shrubby stalk, three or four feet high, which puts out several side-branches quantity of vitriol [illegible] a small octohedron.

ECATOMBÆON, in chronology, the first month of the Athenian year. It consisted of 30 days and answered to the latter part of our June and beginning of July.

ECHENEIS, the remora, in ichthyology, a genus belonging to the order of thoracici. There are two species, viz.

1. The remora or sucking-fish, with a forked tail, and 18 striæ on the head.

2. The neucrates, with an undivided tail, and 16 striæ on the head. They are both natives of the Indian Ocean.

These fishes are often found adhering so strongly to the sides of sharks and other great fish, by means of the structure of the head, as to be got off with difficulty.

ECHINOPHORA, a genus of the digynia order in the pentandria class of plants; and in the natural method ranking under the 45th order, umbellatæ. There are two species, herbaceous plants of the south of Europe.

ECHINOPS, a genus of the polygamia segregata order, in the syngenesia class of plants, and in the natural method ranking under the 49th order, compositæ. There are five species, annual and perennial plants, one of which is well known under the name of globe thistle.

ECHINORYNCHUS, a genus of the vermes intestina, body round, proboscis cylindrical, and crowned with hooked prickles. They are found in the viscera of various animals, generally the intestines; There are 48 species.

ECHINUS, in zoology, the sea hedgehog, a genus of insects belonging to the order of vermes mollusca. The species are, 1. The esculentus, or eatable echinus, is of an hemispherical form, covered

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metry, a kind of pas-
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rchitecture, the distance
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part it projects from.
Latin grammar, a figure
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l or red surface.
Eddy-water, in marine
the water runs b

The white, or albumen, is nearly of the same nature as the serum of blood.

EHRETIA, in botany, a genus of the monogynia order, in the pentandria class of plants, and in the natural method ranking under the 41st order, asperifoliæ.

There are five species, trees and shrubs of the West Indies.

EHRHARTA, a genus of the monogynia order, in the hexandria class of plants. There are five species.

EJECTMENT, in law, is a mixed action, by which a lessee for years, when ousted, may recover his term and damages; it is real in respect of the lands, but personal in respect of the damages.

EKEBERGIA, in botany, a genus of the class and order decandria monogynia. The calyx is four-parted; petals four; berry contains five oblong seeds. There is one species, a tree of the Cape.

ELÆAGNUS, *oleaster*, or *wild olive*, a genus of the monogynia order, in the tetrandria class of plants, and in the natural method ranking under the 18th order, calycifloræ. There are nine species. The most remarkable are, 1. orientalis, or eastern broad-leaved olive, with a large fruit, it is a native of the Levant and Germany. 2. The angustifolia, without thorns, is commonly preserved in our gardens. The leaves have a shining appearance like satin. The flowers come out at the footstalk of the leaves, sometimes singly, at other times two, and sometimes three, at the same place. The outside of the empalement is silvery and studded; the inside of a pale yellow, and having a very strong scent. 3. The latifolia, with oval leaves, is a native of Ceylon, and some other parts of India.

ELÆIS, a genus of plants belonging to

the ratio of 7509 to 7738.

Elasticity is sometimes increased by cold; thus the range of a cannon-ball is said to be greater when the cannon is cold, than when heated; and the string of a violin, is inflected, and recovers its situation, with less force in hot than cold weather.

Metal fibres, and thin steel laminæ, exhibit no elasticity, unless stretched to a certain degree, and inflected by a certain force, as appears from lax cords, which, if a little stretched and removed from their natural state, discover no tendency to return to it; and when the inflection of a fibre is very great, the influence of elasticity seems to be in some cases annihilated; as appears by the fibres of wood, which, inflected to a certain degree, remain quiescent, and have no tendency to recover their former situations. The limits where the elastic power begins, or where it terminates, are unknown.

ELATE, a genus of plants belonging to the natural order of palmæ. There is one species, a native of the East Indies, which grows to the height of 14 feet.

ELATER, in zoology, a genus of insects, belonging to the order of coleoptera. By means of an elastic spring under the thorax, the animal, when turned upon its back, leaps into the air, and turns itself. In the state of larvæ it inhabits the trunks of decayed trees, and is there transformed.

ELATERIUM, a genus of the monandria order, in the monœcia class of plants; and in the natural method ranking under the 34th order, cucurbitaceæ. There are two species, natives of America.

ELATINE, a genus of the tetragynia order, in the octandria class of plants; and in the natural method ranking under the 15th order, inundatæ. There are

were called by Bergman
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ELECTRICITY, a term
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is one of the principal age

History of Electricity.
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nail or brass wire, confined in a phial, and exposed to the electrifying glass, or to the prime conductor, had a power of collecting the electric virtue so as to produce the most remarkable effects. He found that a small quantity of fluid added to it increased the power, and successive electricians found that fluid matter, or any conducting body confined in a glass vessel, had this power of accumulating and condensing the electric virtue. This was soon followed by another improvement, that of forming what is called the electric battery, by increasing the number of jars, by which means the force is proportionally magnified. Hereby the electric matter was conveyed to great distances: by the French philosophers, near three miles, and Dr. Watson, conveyed it by a wire over the Thames, and back again through the river.

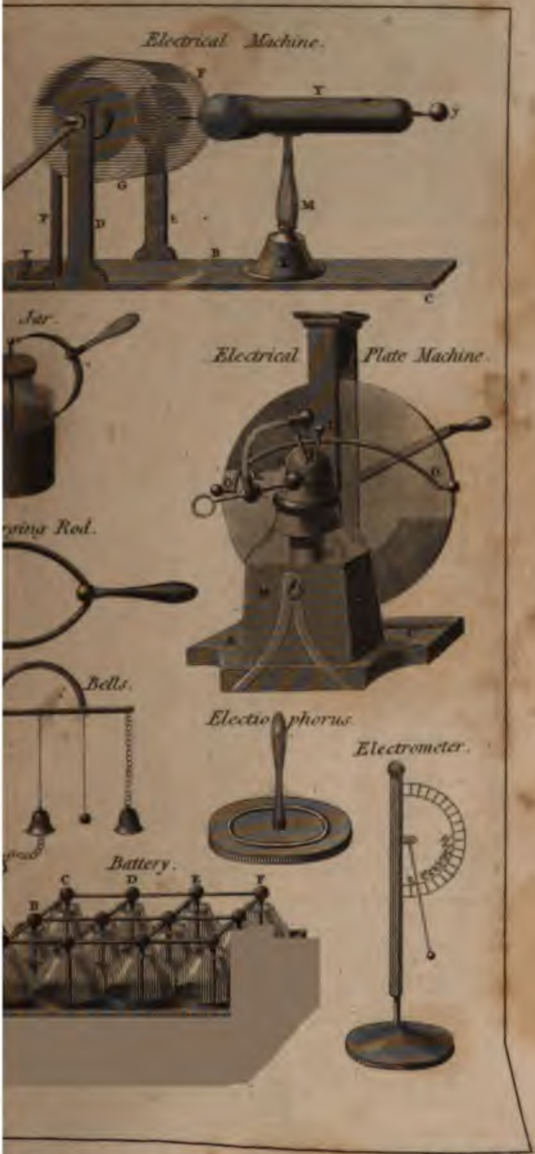
Du Fay made a distinction of two species of electricity, one of which he called the vitreous, and the other the resinous electricity; and soon after the discovery of the Leyden phial, it was found, that by coating the outside with a conducting substance, which communicated by a wire with the person who discharged the phial, the shock was immensely increased, and it appeared that the phial could not be charged unless some conducting substance was in contact with the outside. Dr. Franklin was the first who explained these phenomena. He shewed that the surplus of electricity received by one of the coated surfaces of the phial, was taken from the other; and that one was possessed of less than its natural share of the electric matter, while the other had a superabundance. These different states of bodies, with respect to their portion of lightning from the atmosphere into his house, in order to enable him to make experiments upon it: he also connected with it two bells, which gave him notice by their ringing when his rod was electrified. Thus was the origin of the metallic conductors.

It was afterwards discovered by Mr. Canton, that the positive and negative electricity, which were supposed to depend upon the nature of the excited body, depended chiefly upon the nature of the surface; for that a glass tube, when the polished surface was destroyed, exhibited proofs of negative electricity as much as sulphur or sealing wax, and drew sparks from the knuckle when applied to it, instead of giving fire from its own body: when the tube was greased, and a rubber with a rough surface was applied to it, its positive power was restored, and the contrary when the rubber became smooth by friction.

General principles of electricity. The electric power is the effect of some matter in an active state, either within or round the electrified body; since, if we place our hands or face before an excited tube of glass, or before an insulated conductor which is electrified, we shall perceive emanations sensible to the touch; and if we approach nearer, we shall feel it distinctly, and hear a weak noise: in the dark we perceive sparks of light, we see pencils of rays, or flashes of divergent flame; it is certain therefore, that some subtile matter put in motion makes these impressions on our senses; and we may conclude that every electrified body is encompassed by some matter in motion which is the immediate cause of all the electrical phenomena, and this we term the electric matter.

But what is this electric matter? or whence does it

ELECTRICITY.



Cooper ſculp

d June 1 [illegible] by R. Phillips Bridge Street Blackfriars, London.

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To find the line of contact between the cylinder and cushion, place a line of whiting dissolved in spirit of wine, on the cylinder: on turning this round, the whiting is deposited on the cushion, and marks those parts of it which bear or rub against the cylinder. The amalgam is to be put only on those parts marked by the whiting.

Whenever the electricity of the cylinder grows less powerful, it is easily renewed by turning back the silk and rubbing the cylinder with the amalgamated leather, or by altering the pressure of the screw.

A small quantity of tallow placed over the amalgam gives more force to the electric powers of the cylinder; or the same may be effected by rubbing the cylinder with a coarse cloth, a little greased, and afterwards wiping it with a clean cloth.

As air not only resists the emission of the electric fluid, but also dissipates what is collected, on account of the conducting substances which are floating in it, over the cylinder a piece of black or oiled silk should be placed, from the line of contact to the collecting points of the prime conductor.

Sometimes the silk will adhere so strongly to the cylinder, when zinc amalgam is used, as to render it difficult to turn; but this may be obviated by rubbing a small quantity of aurum musivum, or a little whiting, over the silk, when it is wiped clean.

The following are the directions of Mr. Adams, for exciting the machine.

" To excite your machine, clean the cylinder, and wipe the silk.

1st. The electric matter is one and the same in all bodies. 2d. All terrestrial bodies contain a quantity of this matter. 3d. The electric matter repels itself, but attracts every other. 4th. Glass and other electrics, contain a large portion of this matter, but are not penetrated by it. 5th. Conducting substances are permeable by it, and do not conduct it merely over their surface. 6th. A body may contain a superfluous quantity of the electrical fluid, when it is said to be in a *positive* state, or electrified *plus*; and when it contains less than its proper share, it is said to be *negative*, or electrified *minus*. 7th. By exciting an electric, the equilibrium of the fluid is broken, and the one body becomes over-loaded with electricity, while the other is deprived of its natural share.

Electrical instruments, or apparatus.—The instruments commonly employed in this branch of science, may be classed under six heads: 1st. The instruments used for exciting electricity, viz. glass tubes, plates, and cylinders. 2d, Those for conducting the electric matter, which are chiefly of metal. 3d. Those intended for accumulating the fluid, or, receiving a *charge*, as coated bottles or jars, commonly called Leyden phials. 4th. Those intended to produce more formidable effects, as electric batteries. 5th. Instruments employed for ascertaining the quantity of electricity, called electrometers; and lastly, those employed for retaining the electric power.

I. The first class has been already treated.

II. The nature and use of such conductors as are attached to the machine, have been also explained; but any instrument which serves to convey the electrical influence from one body

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ces, the force of the battery will be increased. For this purpose, cause the sparks to pass through a hole in a plate of glass, one-twelfth or one-sixth of an inch in diameter, by which means it will be more compact and powerful. On wetting the part round the hole, the spark, by converting this into vapour, may be conveyed to a greater distance, with an increase of rapidity, attended with a louder noise than common.

If the charge of a strong battery is passed through two or three inches of small wire, the latter will sometimes appear red-hot, first at the positive side; and the redness will proceed towards the other end.

If a battery be discharged through a small steel needle, it will, if the charge is strong, communicate magnetism to it.

If the discharge of a battery passes through a small magnetic needle, it will destroy the polarity of the needle, and sometimes invert the poles.

Dr. Priestley could melt nine inches of small iron wire at the distance of fifteen feet, but at the distance of twenty feet he could only make six inches of it red-hot. Therefore metals resist in some measure the passage of the electric fluid.

If a slender wire is inclosed in a glass tube, and a battery discharged through this wire, it will be thrown into globules which may be collected from the inner surface of the tube.

Dr. Watson and some other gentlemen made several experiments to ascertain the distance to which the electric shock might be conveyed, and the velocity of its motion. In the first experiment, the shock was given, and spirits inflamed by the electric matter which had been conveyed through the river Thames. In another experiment, the electric fluid was made

At the centre is a socket in which a glass handle nine or ten inches long, is fixed. A thin board, covered with tin-foil, and suspended by silken strings, will answer well, when the electrophorus is wanted of a large diameter.

The underplate may be made of glass, sealing-wax, or the following composition, viz. four parts rosin, three parts pitch, three parts shell-lac, two parts Venice turpentine, melted together over a gentle fire. It may be spread upon a thin linen cloth, to about one-fourth of an inch thick. The cloth must be stretched tight upon a hoop. To use this machine, rub the coated side of the under plate with flannel, and when it is excited set it on a table, and place the upper plate upon it, and put your finger on the upper plate; then remove your finger, and take hold of the top of the glass handle and apply it to the knob of a coated jar. Repeat this operation for 30 or 40 times, and the jar will be charged.

When a glass is covered with sealing-wax, after it is excited and laid with the waxed side downward, and the glass uppermost, on making the usual experiment of putting the metal plate on it, and taking the spark, &c. it will be attended with contrary electricity to what it had before.

The various phenomena of electricity may be divided into four classes; the first including those experiments which serve to illustrate the electrical attraction and repulsion; the second those produced by the stream of electricity; the third all those phenomena which are accompanied with luminous appearances; and lastly, the effects arising from the concentrated electricity, in the experiments with the Leyden phial and electrical battery.

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electricity while in the cup; but if they are separated, then both will be strongly electrified, the sulphur positive, and the cup negative. If the sulphur is replaced in the cup, every sign of electricity vanishes, but if, whilst separate the electricity of the cup or sulphur is taken off, on being replaced they will both appear possessed of that electricity which has not been taken off.

Melted wax, poured into glass or wood, acquires the negative electricity, and the glass or wood the positive. But sealing-wax, poured into a sulphur vessel acquires the positive electricity, and leaves the sulphur negative.

The property of becoming electrified by heating or cooling, was first observed in a pellucid stone called the tourmalin, which is found in the East Indies, especially in the island of Ceylon; but it has been found that several other precious stones, especially the Brasilian emerald, possess the like properties.

The evaporation of water, and some other fluids, produces electricity, viz. those bodies from which the water has departed, will remain in a negative state of electricity, indicating that the water by its conversion into vapour has its capacity for the electric fluid increased, and also for containing heat.

But 1st, if water is evaporated by being in contact with a red-hot piece of rusty iron, it will leave the iron electrified positively; whereas, if the iron is not rusty, the evaporation of the water from its surface a genus of the mammalia class, of the order bruta. The generic character is, cutting-teeth none in either jaw; tusks in the upper jaw; proboscis very long, prehensile: body nearly naked. There are two species.

1. The elephas maximus, the great elephant 2. The sukotyro. Elephants are naturally gregarious. They feed only on vegetables. The animal is generally of a deep ash-coloured brown, or nearly blackish; but in some parts of India it is sometimes found of a white colour. In the young animals the tusks are not visible; in the more advanced state they are very conspicuous: and in the full-grown animal they advance several feet from the mouths of their sockets: it is but rarely that the tusks are seen in the females; and when they appear, they are small. Tusks have sometimes been seen upwards of ten feet long; particularly from Mosambique and Cochinchina.

The teeth which are imported into Europe are generally from Africa, where they are frequently found in the woods.

The elephant is undoubtedly the largest of all terrestrial animals, arriving at the height of twelve feet, though the more general height seems to be from nine to ten feet. Elephants are commonly found in the midst of shady woods, and they delight in cool spots, near rivers. They are capable of swimming with great ease. Their general food consists of the tender branches of various trees, as well as grains and fruits. It is for this reason that their incursions are so much dreaded in plantations of various kinds, where they are said occasionally to commit the most violent depredations; at the same time, injuring the crops by trampling the ground with their feet The trunk of the elephant is the organ of respiration, and the in-

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4. The citrinella, or yellow-hammer, has a blackish tail, only the two outward side-feathers are marked on the inner edge with sharp white spots. It is a bird of Europe.

5. The schœniclus, or reed-sparrow, has a black head, a blackish-grey body, and a white spot on the quill-feathers. It inhabits marshy places, most commonly among reeds, from which it takes its name.

6. The oryzivora, or rice-bunting, with the head and whole under side of the body black; hind part of the neck in some yellow, and in others white: coverts of the wings and primaries, black, the last edged with white; part of the scapulars, lesser coverts of the wings, and rump, white; back black, edged with dull yellow; tail of the same colours, and each feather sharply pointed; the legs are red.

7. The cirlus is brown; breast spotted; eye-brows pale yellow; the two outmost tail-feathers with a white wedged spot. It inhabits France and Italy, and feeds on seeds, worms, and insects.

8. The ciris; the head blue; belly orange; back green; the feathers green-brown. It inhabits Carolina, Cuba, and South America.

EMBOSSING, or *Imbossing*, in architecture and sculpture, the forming or fashioning works in relievo, whether cut with a chissel or otherwise.

EMBOTHRIUM, a genus of plants of the class and order correspond exactly in their structure and properties; and Vauquelin found that they were composed of the same ingredients: henceforth, therefore, they must be considered as varieties of the same species.

EMERSION, in astronomy, is when any planet eclipsed begins to emerge or get out of the shadow of the eclipsing body. It is also used when a star before hidden by the sun begins to re-appear.

EMERY, in natural history, a rich iron-ore found in large masses, of no determinate shape or size, extremely hard and very heavy. Usually of a dusky brownish-red colour on the surface, but when broken, of a fine, bright, iron-grey, but not without some tinge of redness, and spangled all over with shining specks, which are small flakes of a foliaceous talc, highly impregnated with iron. It is also sometimes very red, and usually contains veins of gold.

Emery when ground is of great use to various artificers in polishing and burnishing iron and steel works, marble, cutting and scalloping glass, &c.

EMOLLIENTS, in medicine and pharmacy, are such remedies as soften the asperity of the humours, and relax and supple the solids.

EMPETRUM, *berry-bearing heath*, a genus of the triandria order, in the monœcia class of plants, ranking in the natural method under the 54th order, miscellaneæ; and likewise among those called dubious. There are two species; one of which, viz. the nigrum, bears the crowcrake berries, and is a native of Britain. It grows wild on boggy heaths and mountains. The album is a native of Portugal, and bears white berries.

EMPHYSEMA, in surgery, a windy tumour, generally occasioned by a fracture of the ribs

ared thus: take litharge of
t it in a pan, pour on distilled
g it over a gentle fire till
omes impregnated with the
, evaporate half the vine-
cool place to crystallize,
tals dry for use; half a
al crystal calcined whiten,
alt of polverine, or other
m and bake in a slow heat
ours, then melt the mass,
it in an agate mortar, or
essel.
n.—Take one ounce of cop-
unces of sand, one ounce
t an ounce of nitre; or two
of sand, two of litharge, one
itre; mix them with equal
r vary the proportions ac-
tint of colour required.
k.—Take calcined iron one
, crude or prepared, one
r two ounces, and manga-
e; mixed with equal parts
ting or grinding together.
ow.—Take of lead and tin
unce, litharge one ounce,
ounce, sand one ounce,
ces; calcine or melt them
verise and mix them with a
of flux, as the nature of the
uire.
e.—Take prepared cobalt
d one ounce, red lead one
ne ounce, flint-glass two
d together by fire, pulveri-
according to the degree of
ngth of colour required.
.—Take one ounce of the
nce of black, half an ounce
d them for use; if neces-
o make it softer.
te.—Take tin prepared by
ounce, red lead one ounce,
e-stone or natural crystal
tre one ounce, arsenic one
qual parts of flux, for more or
ess or opacity may require.
ple.—Dissolve the finest
regia, regulated with sal
t it in a sand-heat for about
igest the gold. Collect the
it with six times its weight
t it into a crucible on the
lphur is evaporated, then
e powder with twice its
ury, put it into a mortar and
t six hours, with a small
ter which change frequent-
the mercury in a crucible,
powder ten times its weight
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colour.—Take purple as
with thirty times its weight
hundred part of its weight
r any preparation of silver,
portion of the flux and sil-
lity of the colour may re-
f the other preparations for
varying the proportion of
er.
n.—Take red lead *one*
iron one ounce, antimony
arge twoounces, caffer one
ounces, calcined, or melt-
ed raw, as may be most

Method of application.—These colours may be applied to vessels of glass by painting, printing, or transferring, dipping, floating, and grounding.

Top-tint.—Mix the colours in a state of fine powder with spirits of turpentine, temper them with thick oil of turpentine, and apply them with a camel-hair pencil, or other instrument, or mix them with some essential or volatile oil, or with water, in which case use gum arabic, or with spirits, varnishes, waxes, or resins;

To print.—Take a glue bat, full size, for the subject, charge the copper-plate with the oil or colour, and take the impression with the bat from the plate, which impression transfer on the glass: if the impression is not strong enough, shake some dry colour on it, which will adhere to the moist colour; or take any engraving or etching, or stamp, or cast, and having charred it with the oil or colour, transfer it on the glass by means of prepared paper, vellum, leather, or other substance that will answer; but the first is the best.

To dip.—Mix the colour to about the consistency of a cream with any of the ingredients used for printing, in which dip the glass vessel, and keep it in motion till smooth.

To ground.—First charge the glass vessel with oil of turpentine, with a camel-hair pencil, and while moist apply the colour in a powder, which will adhere to the oil, or, instead of oil of turpentine, use any of the materials used for printing.

To float.—Mix the colour with any of the ingredients used for printing, to a consistency according to the strength of ground required, float it through a tube, or any other vessel, moving or shaking the glass till the colour is spread over the part required.

ENARGEA, in botany, a genus of the hexandria monogynia class and order. There is no calyx; the petals are six; berry three-celled; four or five globular seeds. There is one species, a native of Terra del Fuego.

ENCANTHIS, in surgery, a tubercle arising from the caruncula lachrymalis, or from the adjacent red skin; sometimes so large, as to obstruct not only the puncta lachrymalis, but also part of the sight or pupil itself.

ENCAUSTIC *painting*, a method of painting made use of by the antients, in which wax was employed to give a gloss to their colours, and to preserve them from the injuries of the air.

This art, after having been long lost, was restored by count Caylus, and the method of painting in wax was announced to the French Academy of Painting and Belles Lettres, in 1753; though M. Bachelier, the author of a treatise De l'Histoire et du Secret de la Peinture en Cire, had actually painted a picture in wax in 1749. The cloth or wood is rubbed over with bee's-wax; then stretched on a *frame, being* held horizontally over, or *perpendicularly* before a fire, at such a *distance, that* the wax may gradually *melt, whilst* it is rubbed on, diffuse itself, *penetrate* the body, and fill the interstices *of the* texture of the cloth, which, when gin-wax, till it is covered with a coat of considerable thickness. In fine linen, this is the only operation necessary previous to painting; but coarse cloth must be rubbed on the unwaxed side with a pumicestone, to take off knots. Then the subject is to be painted on the unwaxed side with colours prepared and tempered with water; and when the picture is finished, it must be brought near the fire, that the wax may melt and fix the colours. This method, however, can only be applied to cloth or paper, through the substance of which the wax may pass; but in wood, stone, metals, or plaister, the former method of count Caylus must be observed.

Mr. Muntz has also discovered a method of forming grounds for painting with crayons, and fixing these, as well as water-colours, employed with the pencil.

Almost all the colours that are used in oil-painting may be also applied in the encaustic method. Mr. Muntz objects, indeed, to brown, light pink, and unburnt terra di Sienna; because these, on account of their gummy or stony texture, will not admit such a cohesion with the wax as will properly fix them; but other colours which cannot be admitted in oil-painting, as red lead, red, orpiment, crystals of verdegris, and red precipitate of mercury, may be used here. Notwithstanding these discoveries and improvements the antient method of painting in wax remained a desideratum till a method was communicated to the Society of Arts by miss Greenland, in 1787. She received her information at Florence. Her method is as follows: " Take an ounce of white wax, and the same weight of gum mastich powdered. Put the wax in a glazed earthen vessel over a very slow fire; and when it is quite dissolved strew in the mastich, a little

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When the graver is too hard, which may be known by the frequent breaking of the point, the method of *tempering* it is as follows: Heat a poker red-hot, and hold the graver upon it, within half an inch of the point, till the steel changes to a light straw-colour; then put the point into oil to cool, or hold the graver close to the flame of a candle, till it be of the same colour, and cool it in the tallow: but be careful either way, not to hold it too long, for then it will be too soft; and in this case the point, which will then turn blue, must be tempered again.

To hold the graver, cut off that part of the handle which is upon the same line with the belly, or sharp edge of the graver; making that side flat, that it may be no obstruction.

Hold the handle in the hollow of your hand; and, extending your fore-finger towards the point, let it rest on the back of the graver, that you may guide it parallel with the plate.

To lay the design upon the plate, after you have polished it fine and smooth, heat it so that it will melt virgin-wax, with which rub it thinly over, and let it cool. Then the design which you lay on, must be drawn on paper, with a black-lead pencil, and laid upon the plate, with its pencilled side upon the wax: then press it to, and with a burnisher go over every part of the design: and when you take off the paper, you will find every line upon the waxed plate, then, with a sharp-pointed tool, trace all your design through the wax upon the plate, and you may then take off the wax, and proceed to work.

Let the table, or board you work at, be firm and steady; upon which place your the etching, with the fainter parts, and advancing gradually with the stronger, till the whole is completed. See *Etching*.

The dry point, or needle, is principally employed in the light parts of water, sky, drapery, &c.

To prevent any obstruction from too great a degree of light, the use of a sash, made of transparent or fan paper, pasted on a frame, and placed sloping at a convenient distance between your work and the light, will preserve the sight.

Of mezzotinto engraving or scraping.— This art, which is of late date, is recommended for the ease with which it is executed, especially by those who understand drawing.

Mezzotinto prints are those in which the lights and shades are blended together, and appear like a drawing in Indian ink.

The tools necessary for mezzotinto scraping are the grounding-tool, burnishers, and scrapers.

To lay the mezzotinto ground, lay your plate, with a piece of flannel under it, on your table: hold the grounding-tool in your hand perpendicularly: lean upon it moderately hard, continually rocking your hand in a right line from end to end, till you have covered the plate in one direction: next cross the strokes from side to side, afterwards from corner to corner, working the tool each time all over the plate, in every direction, taking all possible care not to let the tool cut (in one direction) twice in a place. This done, the plate will be full, and would, if printed, appear completely black.

Having laid the ground, take the scrapings of black chalk, and with a piece of rag rub it over the plate: or smoke it with candles.

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quantity of resin; and to ascertain the proper proportions, several pieces of copper must be provided, on which the liquid may be poured, and the grain examined, before it is applied to the plate to be engraved. After the solution is made, it must stand still for a day or two, till the impurities of the resin have settled to the bottom, and the fluid becomes pellucid. Care must be taken to avoid dust, for if a particle falls on the plate while wet, it causes a white spot, which it is impossible to remove without laying the grain afresh. The plate must also be previously cleaned, with a rag and whiting, as the smallest spot of grease produces a blemish in the grain.

Engraving on wood.—This is a process exactly the reverse to engraving on copper. In the latter, the strokes to be printed are cut into the plate and a rolling-press is used for printing it; but in engraving on wood, all the wood is cut away, except the lines to be printed, which are left standing up like types, and the mode of printing is the same as that used in letter-press.

The wood used for this purpose is box planed smooth. The design is drawn upon the wood itself with black lead; and all is cut away with gravers and other tools, except the lines that are drawn. Sometimes the design is drawn upon paper, and pasted upon the wood, which is cut as before. This art is useful for books, as the printing of it is cheaper than that of copper-plates.

In *engraving on precious stones*, they use the diamond, or emery. In engraving diamonds the first thing is to cement two rough diamonds to the ends of two sticks held steady in the hand, and rub or grind them against each other till they are brought into form. The powder serves to polish them, which is performed with a mill that turns an iron wheel. The diamond is fixed in a brass dish, and applied to the wheel, and covered with diamond-dust, mixed with oil of olives; and when the diamond is to be cut facet-wise, they apply first one face, then another, to the wheel. Rubies, sapphires, and topazes, are cut and formed on a copper wheel, and polished with tripoli diluted in water. Agates, amethysis, emeralds, hyacinths, granites, rubies, and the softer stones, are cut on a leaden wheel, moistened with emery and water, and polished with tripoli, on a pewter wheel. Lapis-lazuli, opal, &c. are polished on a wooden wheel. To fashion and engrave vases of agate, crystal, lapis-lazuli, they use a lathe, on which are the tools, which are turned by a wheel; and the vessel is held to them to be engraved, either in relievo or otherwise; the tools being moistened, from time to time, with diamond-dust and oil, or emery and water. To engrave figures or devices on these stones, when polished, such as medals, seals, &c. they use a little iron wheel, the ends of whose axis are received within two pieces of iron, placed upright, and brought closer, or set further apart, at pleasure: at one end of the axis are fitted the proper tools, being kept tight by a screw. The wheel is turned by the foot, and the stone applied by the hand to the trices and dyes: though sometimes they begin with the creux, but only when the work is to be cut very shallow. The first thing done is the designing the figures; the next is the moulding them in wax, of the size and depth they are to lie, and from this wax the punch is engraved. When the punch is finished, they give it a high temper, that it may the better bear the blows of the hammer with which it is struck, to give the impression to the matrix.

The steel is made hot to soften it, that it may more readily take the impression of the punch; and after striking the punch on it, in this state, they proceed to finish the strokes and lines, with steel-gravers, chisels, flatters, &c.

The figure being thus finished, they proceed to engrave the rest of the medal, as the mouldings of the border, the engrailed ring, letters, &c. with little steel punches.

ENMANCHE, in heraldry, is when lines are drawn from the centre of the upper edge of the chief to the sides, to about half the breadth of the chief; signifying sleeved, or resembling a sleeve.

ENNEANDRIA, in botany, the ninth class of plants with hermaphrodite flowers, and nine stamina or male parts in each. To this class belong the laurus, rheum, spondias, butomus, &c.

ENSIGN, in the military art, a banner under which the soldiers are ranged according to the different companies or parties they belong to. Also the officer that carries the colours.

ENTABLATURE, or *entablement*, in architecture, is that part of an order of a co-

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EPHEMERIDES, in astronomy, tables shewing the present state of the heavens for every day at noon, that is, the places wherein all the planets are found at that time. From these tables the eclipses, conjunctions, and aspects of the planets, are determined.

EPHIELIS, a genus of plants of the class and order octandria monogynia. The calyx is five-parted; petals five-clawed; nect. ten scales; capsule oblong. There is one species, a tree of Guiana.

EPIBATERIUM, a genus of plants of the monœcia hexandria class and order. The calyx is double; petals six; drupes three, subglobular, mucronate, &c. There is but one species.

EPIC, a term applied to an historical poem, or one which is expressed in the way of narrative.

EPICEDIUM, a poem rehearsed during the funeral solemnity of persons of distinction.

EPICHIREMA, in logic, a mode of reasoning, which comprehends the proof of one or both the premises of a syllogism, before the conclusion is drawn.

EPICENE, in grammar, a term applied to nouns, which, under the same gender and termination, mark indifferently the male and female species.

EPICYCLE, in the antient astronomy, a little circle whose centre is in the circumference of a greater one; or a small sphere, which being fixed in the deferent of a planet, is carried along with it; and yet, by its own peculiar motion, carries the planet fastened to it round its proper centre. It was by means of epicycles that Ptolemy and his followers intended to solve the phenomena of the planets.

EPICYCLOID, in geometry, a curve ge-

EPILEPSY, in medicine, the same with what is otherwise called the falling-sickness, from the patient's falling suddenly to the ground.

EPILOBIUM, the *Willow-herb*, in botany, a genus of the monogynia order, in the octandria class of plants; and in the natural method ranking under 17th order, calycanthemæ. There are fourteen species, several of them natives of Britain. They grow in marshes, or under hedges in moist and shady places; having blossoms generally of a red colour, and sometimes of considerable beauty. The most remarkable is the hirsutum, commonly called codlins-and-cream.

EPILOGUE, in dramatic poetry, a speech addressed to the audience after the play is over.

EPIMEDIUM, *Barren-wort*, in botany, a genus of the monogynia order, in the tetrandria class of plants; and in the natural method ranking under the 24th order, corydales. There is only one species, viz. the alpinum. It is a low herbaceous plant, with a creeping root.

EPIPHONEMA, in rhetoric, a sententious exclamation, containing a lively remark placed at the end of a discourse or narration.

EPIPHYSIS, in anatomy, a bony substance, affixed to a larger or principal bone by the intervention of a cartilage.

EPISODE, in poetry, a separate incident, story, or action, which a poet invents, and connects with his principal action, that his work may abound with a greater diversity of events.

EPISTROPHE, in rhetoric, a figure wherein that which is supposed of one thing, is strongly affirmed of another.

EPISTYLE, in the antient architecture, a term used by the Greeks for what we call

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1. Whenever the sun comes to this circle there are equal days and nights all round the globe; because he then rises due east, and sets due west. Hence it has the name equinoctial. All stars under this circle also rise due east, and set due west.

2. People living under this circle, or upon the equator or line, have their days and nights at all times equal.

3. From this circle, on the globe, are counted on the meridian, the declination in the heavens, and the latitude on the earth.

4. On the equinoctial, or equator, is counted the longitude, making in all 360 deg. quite round, or 180 deg. E. and 180 deg. W.

5. And as the time of one whole revolution is divided into 24 hours, therefore 1 hour answers to 15 deg. or the 24th part of 360 deg. Hence.

1° of longitude answers to 4 min. of time.
15′ - - - - - - - to 1 min. of time,
1′ - - - - - - - to 4 sec. of time &c.

6. The shadows of those people who live under this circle are cast to the southward of them one half of the year, and to the northward the other half; and twice a year, viz at the time of the equinoxes, the sun at noon casts no shadow, being exactly in their zenith.

EQUINOX, the time when the sun enters either of the equinoctial points, where the ecliptic intersects the equinoctial.

It is so called, because when the sun is in these points, the days and nights are of an equal length all the world over. As the sun is in one of them in the spring, viz. about the [illegible]th of March, it is called the vernal equinox: and in the autumn, viz

This precession in one year is trifling; but the accumulation of it, in a number of years, produces a considerable difference and in a hundred years it amounts to 1 deg. 23 min. 45 sec.

How can the sun return to the same equinox at the end of every year, without returning to the same spot in the heavens, or to the same fixed star is the usual difficulty. To clear this observe that the equator is a circle, which, being equidistant from the poles, divides the celestial sphere into two equal portions. Now, if the poles were stationary, or coincided constantly with the same spots in the heavens, the equator would pass constantly over the same fixed stars, and cut the ecliptic constantly at the same points; for the ecliptic is an invariable circle, that is, it passes always over the same stars. But the poles are subject to a constant though small, movement: so that if at every time one of the two points in the heavens, which do not revolve with the daily revolution of the rest of the sphere, and which we for that reason call the poles, be near a certain star, some years after it will be found near some other star; or, in other words, the polar star is not always the same. It appears, from the result of calculations that the path of either of the poles is a circle, the poles of which coincide with those of the ecliptic, and that the pole will move along that circle so slowly, as to accomplish the whole revolution in 25791 years nearly. The diameter of this circle is equal to twice the inclination of the ecliptic to the equator, or about 47 deg.

Now, as the ecliptic is a fixed circle in the heavens; but the equator, which must be equidistant from the poles, moves with the poles; therefore the equator must be constantly changing its intersection with the ecliptic. And from the best observa-

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and in the natural method ranking among the doubtful.

There are five species, herbs or under shrubs of the Cape of Good Hope.

ERICA, *heath*, a genus of the monogynia order, in the octandria class of plants, and in the natural method ranking under the 18th order, bicornes. There are upwards of 100 species, four of which are natives of Britain. In the Highlands of Scotland, the poorer inhabitants make walls for their cottages with alternate layers of heath and mortar made of black earth and straw. They also make their beds of it, by placing the roots downwards. Cabins are also thatched with it. In the island of Ilay, ale is frequently made by brewing one part of malt and two of the tops of young heath, sometimes adding hops. Woollen cloth boiled in alum-water, and afterwards in a strong decoction of heath-tops, obtains a fine orange-colour. The stalks and tops will tan leather. Besoms, and faggots to burn in ovens, are also made of this plant. Bees extract honey from the flowers; and where heath abounds, the honey has a reddish cast.

ERIDANUS, in astronomy, a constellation of the southern hemisphere, containing according to different authors, 19, 3[illegible], or even 84 stars.

ERIGERON, *flea-bane*, a genus of the polygamia superflua order, in the syngenesia class of plants, and in the natural method ranking under the 49th order, compositæ. There are 30 species of which the most remarkable is the viscosum. It is a native of the south of France and Italy; and has a perennial root, whence arise many upright stalks near three feet high. The flowers are single on long footstalks; they are of a yellow colour and most of the temperate parts of Europe and Asia, and also in Madagascar. It commonly measures about 11 inches from the nose to the tip of the tail, which is about an inch long. Its colour is grey-brown, or a yellowish white. It principally feeds on the roots of vegetables; but it also eats worms, as well as beetles and other insects. It wanders about chiefly by night, and during the day conceals itself in its hole, under the roots of some tree or mossy bank. It produces four or five young at a birth, which are soon covered with prickles like those of the parent animal. The nest is large and composed of moss.

The hedgehog, when disturbed, rolls itself up into a globular form, and thus presents to its adversary an invulnerable ball of prickles. From this state, it is not easily forced; scarcely any thing but cold water obliging it to unfold itself. It swims well.

During winter, it lies in its hole, surrounded with a bed of moss, secure from the rigours of the most piercing frost, and at the return of spring, it comes out again.

The hedgehog has frequently been introduced into houses for the purpose of expelling the blattæ, or cockroaches, which it is very fond of.

2. Erinaceus inauris. Earless hedgehog. This, on a general view, seems to be nothing more than a variety of the common hedgehog, differing chiefly, in having the spines on the upper parts of the body shorter, thicker and stronger; and there is no appearance of external ears; the whole animal is also of a white or pale colour. Its length from nose to tail is about eight inches; the tail scarcely an inch long the claws long and crooked.

3. Erinaceus auritus. Long-eared hedgehog. This

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This is of a yellowish-white colour, spotted with black, and infests the leaves of cabbages, cauliflowers, and the Indian cress, of which it eats all the tender parts, leaving only the fibres entire. It is called by the gardeners a grub.

ERUCÆ *aquaticæ*, *water caterpillars.* Reaumur, in his observations, met with two species of these; the one upon the pond-weed, the other upon the lenticula or duck-meat. They are both industrious animals; but the first being much the largest, its operations are more easily distinguished. This, though an aquatic animal, swims badly. The parent butterfly lays her egg on the leaf of a certain plant; and as soon as the young caterpillar is hatched, it gnaws out a piece of the leaf, of a roundish shape. This it carries to another part of the same leaf, and lays it in such a manner, that there may be a hollow between in which it may lodge. It then fastens down this piece to the larger leaf with silk of its own spinning, only leaving holes at which it can put out its head, and get to gnaw any of the leaves that are near. It easily gets out, though the aperture is naturally small, since a little force from its body bends up the upper leaf and the lower down, both being flexible; and when the creature is out, it has a sort of down that defends it from being wetted, and the natural elasticity of the leaves and silk joins the aperture again, so that no water can get in. The leaves of this kind of plant are also naturally slippery, and not easily wetted by water. The changes of this creature into the chrysalis and butterfly states are in the common method. The butterfly gets out of a chrysalis which was placed on the surface of the water; the lightness of the animal sustains it till its wings are dried, and then it leaves that

ERUCTATIONS, in medicine, the effect of flatulent foods, and the consequent crudities.

ERUPTION, in medicine, a sudden and copious excretion of humours, and the same with exanthema, or breaking out, as the pustules of the plague, small-pox, measles, &c.

ERVUM, the lentil, a genus of the decandria order and the diadelphia class of plants, and in the natural method ranking under the 32d order papilionaceæ. There are six species; the most remarkable is the lens, or common lentil, which is cultivated in many parts of England as fodder for cattle, or for the seeds, which are sometimes used in soups. It is an annual plant, and rises with weak stalks about 18 inches high, with winged leaves composed of several pairs of narrow lobes, terminated by a clasper or tendril, which fastens to any neighbouring plant, and is thereby supported; the flowers come out three or four together, on short footstalks from the side of the branches. They are of a purple colour, and are succeeded by pods, containing two or three seeds.

There is another sort cultivated in this country, called French lentil. It is much larger than the former, and better worth cultivation. It should be sown in March, after a single ploughing in the ground that bore corn the year before, when fresh, it makes admirable pea-soup; when dry, it is eaten by the poultry and cattle.

ERYNGIUM, *sea-holly*, or *eryngo*, a genus of the digynia order, in the pentandria class of plants; and in the natural method ranking under the 45th order, umbellatæ. There are 11 species; most of them hardy herbaceous perennials, producing stalks from one to three feet high; with simple, entire, or divided prickly leaves; and the stalks terminated by roundish aggregate heads of flowers, white, blue, or purple. The leaves of one of the species (viz. the maritimum, which grows naturally on the sea-coasts of England and Scotland) are sweetish, with a light aromatic warmth and pungency. The young flowering shoots are eaten like asparagus.

ERYSIMUM, *hedge-mustard*; a genus of the siliquosa order, in the tetradynamia class of plants; and in the natural method ranking under the 39th order, siliquosæ. There are eight species; of which the most remarkable is the officinale, hedge-mustard, or bank-cresses. It grows naturally in Britain under walls, by the sides of

genus of the monogynia order,
andria class of plants, and in
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mentaceæ. There is only one
admits of several varieties in
as white, purple, red, and
plants are low and herbaceous,
ple stalk and hexapetalous
They rarely perfect their
country, but may be propaga
sets.

ERYTHROXYLON, a genus
gynia order, in the decand
plants; and in the natural
in the order of doubtful.
five species, beautiful shrubs
Indies.

ESCALADE, in war, a furio
a wall or a rampart; carried
ders, to pass the ditch or
part, without proceeding in
ing ground, or carrying on
to secure the men.

ESCALLONIA, a genus of
nia order, in the pentandria
There are two species, shrub
Indies and South America.

ESCAPE, in law, is where
rested gains his liberty before
ed by law.

Escapes are either in civil
cases: and in both respects
tinguished into voluntary an
voluntary, where it is with
the keeper; negligent where
of due care.

In civil cases, after the
been suffered voluntarily
sheriff can never after re
must answer for the debt, bu
may retake him at any time
of a negligent escape, the
fresh pursuit, may retake the
the sheriff shall be excused
again before any action is
himself for the escape.

In criminal cases, an esca
arrested is an offence again
tice, and the party is punis
and imprisonment.

ESCHALOT. See *Allium*.

ESCHAR, in surgery, the
occasioned by burns or
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ESCHEAT, in law, denotes
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anal, are of a pale

the defence of tender plants.

ESPLANADE, in fortification, the sloping of the parapet of the covered way towards the campaign, and the same with glacis.

ESPLEES, in law, the general products which lands yield, or the profit or commodity which is to be taken or made of a thing.

ESSENCE, in philosophy, the particular nature of each genus or kind, and that which distinguishes it from all others.

ESSOIN, in law, an excuse for a person summoned to appear and answer to an action, on account of sickness or other just cause of his absence.

ESSOIN-DAY, is regularly the first day of every term, though the fourth day after is also allowed by way of indulgence.

ESTATE, in law, signifies such inheritance, freehold, term for years, tenantcy by statute-merchant, staple, elegit, or the like, as any man has in lands and tenements, Estates are real, of lands, tenements, &c. or personal, of goods or chattels; otherwise distinguished into freeholds that descend to the heir, and chattels which go to the executors.

ESTOILEE, in heraldry, a star with only four long rays in form of a cross; broad in the centre, and terminating in sharp points.

ESTOPPEL, in law, an impediment or bar to an action, which arises from a person's own act; or where he is forbidden by law to speak against his deed, which he may not do, even to plead the truth.

ESTOVERS, in law, is a liberty of taking necessary wood for the use or furniture of a house or farm.

ESTRAYS, in law, are where any hor-lows:

Take one-third of bees-wax to two-thirds of pitch; melt them in an iron ladle, and then pour them into water luke-warm: mould it with your hand till it is thoroughly incorporated, and all the water is squeezed out, then form it into rolls.

Turpentine-varnish is used for covering the copper-plate, in any part where the aquafortis ought not to bite. This may be diluted to a proper consistence with turpentine, and mixed with lamp-black.

Etching-ground is used for covering the plate previous to drawing the lines, and is thus prepared.

Take of virgin-wax and asphaltum, each 20 ounces; of black and Burgundy-pitch, each half an ounce; melt the wax and pitch in a glazed pipkin, adding to them, by degrees, the asphaltum, finely powdered. Let the whole boil till a drop will break when cold, on bending it double between the fingers. When the varnish is boiled, it must be set to cool a little, then poured into warm water, that it may work the more easily with the hands.

The fire must not be too violent, a slight simmering will be sufficient while the asphaltum is putting in, and after it is mixed, the ingredients should be stirred with a spatula: lastly, the water into which this composition is thrown, should be nearly the same degree of warmth with it, to prevent cracking.

The varnish ought to be harder in summer than winter.

To lay the ground for etching, proceed thus. Having cleaned the copper-plate with whiting and a linen rag, fix a hand-vice to that part where no work is intended to be, to serve as a handle for managing it. Roll some coarse brown paper, and light one end; then hold the back of the plate over the burning paper, moving

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This etching may be also performed by raising a margin of wax round the glass, in the same manner as on copper, and pouring on the liquid fluoric acid, which acts upon the glass.

A third method is this. Having put the wax on the glass, draw your design, and raise a margin round it. Then put pounded fluor spar, with some sulphuric acid diluted with water, upon the glass. The sulphuric acid will disengage the fluoric, which will be absorbed by the water, and corrode the glass.

ETHICS, or *Morality*, the science of morals or duty, which it traces from man's nature and condition, and proves to terminate in his happiness; or, in other words it is the knowledge of our duty and felicity, or the art of being virtuous and happy.

ETHMOIDAL, in anatomy, one of the common sutures of the skull, which goes round the os ethmoides, from which it derives its name, separating it from the bone in contact with it.

ETHOPOEIA, or *Ethology*, in rhetoric, a draught or description, expressing the character of a person.

ETHULIA, a genus of the class and order syngenesia polygamia æqualis. The receptacle is naked; down none. There are six species, chiefly annuals of the East Indies.

ETYMOLOGY, that part of grammar which considers and explains the origin and derivation of words, in order to arrive at their first and primary signification.

EVAPORATION, in chemistry, the setting a liquor in a gentle heat or in the air, to discharge its superfluous humidity, reduce it to a proper consistence, or obtain its dry remainder.

Evaporation, though generally considered as the effect of the heat and motion of the air, may be produced by a different cause. Fluids lose more by evaporation in the severest frost than when the air is moderately warm. Thus, in the great frost of 1708, it was found that the greater the cold the more considerable the evaporation. Even ice loses by evaporation.

In natural philosophy, *evaporation*, is the conversion of water into vapour, which in consequence of becoming lighter than the atmosphere, is raised considerably above the surface of the earth, and afterwards by a partial condensation forms clouds. It differs from exhalation, which is properly a dispersion of dry particles from a body.

EUCALYPTUS, a genus of the hexandria monogynia class and order of plants. Of which there are two species, lofty trees of New Holland; called also the red gum tree, from a gummy matter, in which one of them, the resinifera, abounds. A single tree, when tapped, affords more than 60 gallons of juice, which dried becomes a powerfully astringent gum resin, efficacious in dysenteries, &c.

EUCLEA, a genus of the diæcia dodecandria class and order of plants. There is only one species, a branching tree of the Cape.

EUCOMIS, a genus of plants of the class and order hexandria monogynia. There are four species, plants of the Cape.

from 20 to 30 feet high; and bear plum-shaped fruit, inclosing one nut.

EVICTION, signifies a recovery of lands or tenements by law.

EVOLUTE, in the higher geometry, a curve which by being gradually opened, describes another curve. All the arches of evolute curves are rectifiable, if the radii of the evolute can be expressed geometrically.

EVOLUTION. See *Algebra*.

EVOLUTION, in war, the motion made by a body of troops, when obliged to change their form and disposition, to preserve a post, or occupy another, to attack an enemy with more advantage, or to be in a better condition of defending themselves.

EVOLVULUS, a genus of the tetragynia order, in the pentandria class of plants; and in the natural method ranking under the 29th order, campanaceæ. There are seven species, herbaceous plants, chiefly annuals of the East and West Indies.

EUNONYMUS, *the spindle-tree*; a genus of the monogynia order, in the pentandria class of plants, and in the natural method ranking under the 43d order, dumosæ. There are eight species, the most remarkable are; 1. the Europæus, having an upright woody stem ten or fifteen feet high, with oblong leaves: from the sides of the branches proceed bunches of greenish quadrifid flowers, succeeded by pentagonous capsules, disclosing red seeds. 2. The Americanus, or evergreen spindle tree, has a shrubby stem, rising six or eight feet high, with spear-shaped evergreen leaves growing opposite and from the sides and ends of the branches. The flowers are quinquefid and whitish, and come out in small bunches, succeeded by round rough capsules. The berries of the

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LONDON.—*Course of Exchange.*

		Uncertain prices		Certain prices.
Amsterdam	*giv.*	37 shillings Flemish	*for*	1 pounds terling.
Dublin -	*giv.*	110$\frac{1}{2}$ pounds Irish	*for*	100 pounds British.
France -	*giv.*	25 livres tournois	*for*	1 pound sterling.
Idem	*giv.*	25 francs	*for*	1 pound sterling.
Genoa	*rec.*	47 pence sterling,	*for*	1 pezza fuori di banco.
Hamburgh	*giv.*	35 shillings Flemish	*for*	1 pound sterling.
Leghorn	*rec.*	50 pence sterling,	*for*	1 pezza of 8 reals.
Naples	*rec.*	39 pence sterling	*for*	1 ducat di regno.
Portugal	*rec.*	63$\frac{1}{2}$ pence sterling	*for*	milreis.
Rotterdam	*giv.*	12 florins current	*for*	1 pound sterling.
Spain -	*rec.*	36 pence sterling	*for*	1 dollar of exchange.
Venice -	*giv.*	58 lire piccole	*for*	1 pound sterling.

N.B. As Bourdeaux and Bayonne exchange with London, by francs, it is thought expedient to include the calculation of this exchange under the head of France.

London on Amsterdam.

Reduce 4086 florins 4 stivers 6 penings banco into pounds, shillings and pence sterling, at the exchange of 38 shillings 2 grotes Flemish banco per pound sterling.

Here 1 florin = 40 grotes
12 grotes = 1 shilling
38 *shill.* 2 grot. = 1 pound.

Rule.—Multiply 4086 4 6 by 40 grotes *divide the* product by 38 2, price of exchange, and by 12 grotes.

London on France.

Reduce 3222 livres 2 sols 9 deniers tournois into pounds, shillings, and pence sterling, at the exchange of 25 livres 14 sols tournois per pound sterling.

Here 25 liv. 14 sols = 1 pound.

Rule.—Divide 3222 2 9 by 25 14, price of exchange.

25 14 3222 2 9
20 fraction 20 fraction

514 div. 514)64442 15(125 7 6 result.

Reduce 2545 francs 41 cents into pounds, shillings, and pence sterling, at the exchange of 24 francs 80 cents = 1 pound.

Here 24 francs 80 cents = 1 pound.

Rule.—Divide 2545 41 by 24 80, price of exchange.

2480)254541(102 12 9 result.

London on Portugal.

Reduce 566880 reis into pounds, shillings, and pence sterling, at the exchange of $62\frac{1}{2}$ pence per mil reis.

1000 reis = $62\frac{1}{2}$ pence
240 pence = 1 pound.

Rule.—Multiply 566880 by $62\frac{1}{2}$, price of exchange; divide the product by 1000 reis, and the quotient by 240 pence.

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HOLLAND.—Course of Exchange.
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Currencies, and their par in sterling.

A pound currency = 20 shillings or 240 pence.

In Georgia and South Carolina, a dollar is worth 4 shillings 6 pence currency; therefore

100 pounds currency = 100 pounds sterling.

In New England and Virginia, a dollar is worth 6 shillings currency; therefore.

$133\frac{1}{3}$ pounds currency = 100 pounds sterling.

To reduce this currency into sterling, multiply by 3, and divide by 4.

In Delaware, Maryland, New Jersey, and Pennsylvania, a dollar is worth 7 shillings 6 pence currency: therefore

$166\frac{2}{3}$ pounds currency = 100 pounds sterling.

To reduce this currency into sterling, multiply by 3, and divide by 5.

In New York and North Carolina, a dollar is worth 8 shillings currency; therefore

$177\frac{7}{9}$ pounds currency = 100 pounds sterling.

To reduce this currency into sterling, multiply by 9, and divide by 16.

N. B. The several provincial currencies above mentioned are abolished in the United States of America, and the accounts kept in those monies are not admitted in the courts of justice: they are still used, however, by the force of habit, in certain commercial transactions.

America on London.

Reduce 173 pounds 17 shillings 6pence sterling into dollars and cents at par.

9 pounds = 40 dollars.

Rule.—Multiply 173 17 6 by 40 dollars, and divide the product by 9 pounds.

173 17 6
40
6920
for 10 shillings 20
for 5 ditto 10
for 2 ditto 6 pence 5

9)6955(772 $77\frac{7}{9}$ result.

To prove this operation, multiply 77 $77\frac{7}{9}$ by 9, and divide the product by 40.

EAST INDIES.

Monies of Exchange.

Bombay.

A rupee = 4 quarters or 400 reis
A quarter = 100 reis.

Calcutta.

A rupee = 16 annas or 192 pices
An anna = 12 pices
100 sicca rupees = 116 current rupees

Madras.

A pagoda = 36 fanams or 288 pices.
A fanam = 8 pices.

Exchange.
djustment of the Calcutta customs.
in Prices. Certain Prices.
6 pence for 1 rupee.
8 pence for 1 sicca rupee
9 pence for 1 star pagoda.
Exchange.
ins. Exchange.
erling for 10 sicca rupees.
for 2¼ ditto.
urnois for 10 ditto.
s livres for 10 ditto.
for 2¼ ditto.
for 2¾ ditto.
for 3⅓ ditto,
for 2¾ ditto.
for 2¼ ditto.

WEST INDIES ON LONDON.

Monies of Exchange.

A pound currency = 20 shillings or 240 pence.

Accounts are kept in pounds, shillings, and pence currency.

140 pounds currency = 100 pounds sterling.

Reduce 573 pounds 12 shillings 6 pence sterling into pounds, shillings and pence currency, at the exchange of 140 pounds currency for 100 pounds sterling.

100 pounds sterling = 140 pounds currency.

Rule.—Multiply 573 12 6 by 140, price of exchange, and divide the product by 100 pounds.

EXCHEQUER, a very ancient court of record, established by William the Conqueror, and intended principally to order the revenues of the crown, and to recover the king's debts and duties.

The court consists of two divisions, viz. the receipt of the exchequer, which ma-

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nination, and by him sworn

n law, a writ which lies
ndant in a personal action
nd, nor any effects of his
ntry, by which he may be
trained.

THA, a genus of plants of
order pentandria digynia.
m is spiny. The flowers
fite, with equal inflexions;
riated. There is one spe-

S, or the *flying-fish*, in ich-
us belonging to the order of
The head is scaly, and it
t has 10 radii in the branchi-
ane; the body is whitish,
angular; the pectoral fins,
When pursued by another
itself from the water by
fins, and flies in the air to
distance, till the fins dry.
s down into the water. In
at it is perpetually harassed
s and other fish of prey. If
to avoid them by having
e air, it either meets its fate
or the albatross, or is forced
to the mouths of the inhabi-
ter, who below keep pace
l excursions. This fish is
between the tropics.

LUS, in surgery, called also
and hernia umbilicalis, is a
umour of the abdomen at
a rupture, or distension of
h invest that cavity.

, in rhetoric, is the preamble
f a discourse.

n appellation for the pro-
countries. Exotic plants of
s are very numerous, and
most attention of the gar-

and ESOTERIC, are terms
nal and internal, and were
double doctrine of the an-
ners, the former public and
atter secret or confined to a
of disciples.

N, in physics, denotes an
e bulk of any body by a
rom within.

on or abstraction of caloric
ponding change in the bulk
ch has been subjected to
in the quantity of its heat.
e addition of heat increases
ody, as the abstraction di-

odies are expanded by heat
by cold, and this expansion
dy is always proportional
n of the quantity of caloric
ected; yet the absolute ex-
ntraction, differs exceed-
nt bodies. In general, the
aseous bodies is the great-
uids smaller, and that of so-
all. Thus, 100 cubic inches
e air, by *being heated from*
e of 32deg. to that of 212deg.
137.5 cubic inches; while
ntation of temperature
*bic inches of water as*sume the bulk of 104.5 cubic inches; and 100 cubic inches of iron, when heated from 32 deg. to 212 deg. assume a bulk scarcely exceeding 100.1 cubic inches, From this example, we see that the expansion of air is more than eight times greater than that of water, and the expansion of water about 45 times greater than that of iron.

EX PARTE, a term used in the court of chancery, when a commission is taken out and executed by one side or party only upon the other parties neglecting or refusing to join therein.

EXPECTATION, in the doctrine of chances, is applied to any contingent event, upon the happening of which some benefit, &c. is expected. This is reduced to the rules of computation; for a sum of money in expectation of a particular event has a determinate value before that event happens. Thus, if a person is to receive 10*l*. when an event takes place which has an equal chance or probability of happening and failing, the value of the expectation is half that sum, or 5*l*.; but if there are three chances for failing, and only one for its happening, or one chance only in its favour out of all the four chances, then the probability of its happening is only one out of four, or $\frac{1}{4}$ and the value of the expectation is but $\frac{1}{4}$ of 10*l*. which is only 2*l*. 10*s*. or half the former sum. And in all cases, the value of the expectation of any sum is found by multiplying that sum by the fraction expressing the probability of obtaining it. So the value of the expectation on 100*l*. when there are three chances out of five for obtaining it, or when the probability of obtaining it is 3-fifths, is 3-fifths of 100*l*. which is 60*l*. And if s be any sum expected on the happening of an event, h the chances for that event happening, and f the chances for its failing; then, there being h chances out of $f+h$ for its happening, the probability will be $\frac{h}{f+h}$ and the value of the expectation is $\frac{h}{f+h} \times s$.

EXPECTORANTS, in pharmacy, are medicines which promote expectoration; such are the stimulating gums, and resins, squills, &c.

EXPECTORATION, the act of evacuating or bringing up phlegm, or other matters out of the trachea and lungs, by coughing, &c.

EXPERIMENTAL *philosophy*, is that which deduces the laws of nature, the properties and powers of bodies, and their actions upon each other, from sensible experiments and observations.

In our inquiries into nature, we are to be guided by those rules and maxims which are found genuine, and consonant to a just method of physical reasoning; and these rules are by sir Isaac Newton, reckoned four, viz.

1. *More causes of natural things are not to be admitted, than are true, and sufficient to explain the phænomena: for nature is simple and does nothing in vain.*

2. Therefore of natural effects of the

of which they are the original and universal properties.

4. In experimental philosophy, propositions collected from the phænomena by induction, are to be deemed (notwithstanding contrary hypotheses) either exactly or very nearly true, till other phænomena occur, by which they may be rendered more accurate, or liable to exception. This ought to be done, lest arguments of induction should be destroyed by hypotheses.

EXPERIMENTUM *crucis*, a leading or decisive experiment, is so termed on account of its being like a cross, placed in the meeting of several roads guiding men to the true knowledge of what they are enquiring after; or, on account of its being a kind of torture whereby the nature of the thing is discovered by force.

EXPLOSION, in natural philosophy, a sudden and violent expansion of an aerial or other elastic fluid by which it instantly throws off any obstacle in its way. Explosion differs from expansion, in this: that the latter is a gradual power, acting uniformly for some time; whereas the former is momentary. The expansions of solid substances do not terminate in violent explosions, on account of their slowness, and the small space through which the expanding substance moves. Thus we find, that though wedges of wood when wetted, will cleave solid blocks of stone, they never throw them to any distance, as gunpowder does. On the other hand, it is seldom that the expansion of any elastic fluid bursts a solid substance, without throwing the fragments of it to a considerable distance. The reasons of this may be comprised in these particulars. 1. The immense velocity with which the aerial fluids expand, when affected by a considerable degree of heat. 2. Their

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EXPRESSION, in painting, is the ex-hibition of character in the general [illegible] the work, or of sentiment in the [illegible]ers or persons represented.

[illegible]ASY, in medicine, a species of ca-[illegible] when a person perfectly remem-[illegible]er the paroxysm is over, the ideas [illegible]ceived during the time it lasted.

[illegible]ENSION, in philosophy, one of the [illegible]n and essential properties of body, [illegible] by which it possesses or takes up [illegible]rt of universal space.

[illegible]ENSOR, an appellation given to se-[illegible] muscles, from their extending or [illegible]ing the parts to which they belong.

[illegible]ENT, in law, signifies a writ or [illegible]nd to the sheriff for the valuing of [illegible] tenements; and sometimes the [illegible] the sheriff, or other commissioner, [illegible] his writ; but most commonly it de-[illegible] estimate or valuation of lands, and [illegible]ome our extended or [illegible]

[illegible]ERMINATION, in ge[illegible] [illegible]ting or destroying some[illegible] [illegible] surds, fractions, and [illegible] [illegible]ties, are exterminated by [illegible] [illegible]ducing equations.

EXTRACT, in pharmacy, is a solution of the purer part [illegible] mixed body inspissated, by distillati[illegible]poration, nearly to the consisten[illegible]y.

EXTRACTOR, [illegible]ery, an instrument, or forceps, [illegible]ng children by the head.

EXTRAVASAT[illegible]ontusions, and other accidents o[illegible]ium, is when one or more of th[illegible]ssels distributed on the dura m[illegible]roken, whereby there is such a di[illegible]f blood as oppresses the brain, [illegible]ly bringing on violent pains, an[illegible]th death itself, unless the pat[illegible] timely relieved.

EXTREMES, in [illegible]he terms expressing the two ideas [illegible] relation we enquire after in a sy[illegible]

EXUVIÆ, am[illegible]aturalists, denote the cast-off parts [illegible]erings of animals, [illegible] caterpillars, and [illegible] of sight, or [illegible] visible ob-[illegible] mind. See

F

F, the sixth letter of the alphabet. As a numeral it denotes 40, and with a [illegible] over it thus $\bar{F}$ 40,000: in music it [illegible] for the bass-clef; and frequently [illegible]te, as *ff* does for forte forte.

F, in medicine, stands for fiat, let it be [illegible]

As an abbreviation, F stands for filius, [illegible], &c.: thus F.R.S. signifies Fellow [illegible] Royal Society.

FA, in music, one of the syllables in-[illegible]d by Guido Aretine, to mark the [illegible] note of the modern scale, which rises [illegible] ut, re, mi, fa. Musicians distinguish [illegible]'s, viz. the flat, marked with a *b*, [illegible] the sharp or natural, marked thus [illegible] and called biquadro.

[illegible] *fint*, a feigned F, or a feint upon [illegible] note.

FABLE, a tale or feigned narration, designed either to instruct or amuse, disguised under the allegory of an action.

Fable is also used for the plot of an epic [illegible] dramatic poem; and is, according to Aristotle, the principal part, and the soul of a poem.

FACE, or *facade*, in architecture, the front of a building, on the side which contains the chief entrance. Sometimes, however, it is used for whatever side presents [illegible]treet, garden, court, &c. or is op-[illegible] the eye.

[illegible] *of a stone*, in masonry, that su-[illegible] of it which lies in the *front of* [illegible]rk. *The workmen generally* [illegible] *to make one of those sides the face,* [illegible] *when in the quarry, lay perpendi-*[illegible] *to the horizon, and consequently* the breaking, not the cleaving way of the stone.

FACE, in fortification, an appellation given to several parts of a fortress, as the face of a bastion, &c.

FACET, or *facette*, among jewellers, the name of the little faces or planes in brilliant and rose diamonds.

FACTITIOUS, any thing made by art, in opposition to what is the produce of nature. Thus, factitious cinnabar is opposed to native cinnabar.

FACTOR, in arithmetic, a name given to the multiplier and multiplicand, because they constitute the product.

FACTORAGE, called also commission, is the allowance given to factors by the merchant who employs them. A factor's commission in Britain, on most kinds of goods, is two and a half per cent.

FACULÆ, in astronomy, certain bright and shining parts, which the modern astronomers have, by means of telescopes, observed upon or about the surface of the sun: they are but very seldom seen.

Hevelius assures us that, on July the 20, 1634, he observed a facula, whose breadth was equal to a third part of the sun's diameter. He says too that the maculæ often change into faculæ, but these seldom or never into maculæ. And some authors even contend that all the maculæ degenerate into faculæ before they quite disappear. *Many authors, after Kircher and Scheiner, have represented the sun's body full of bright, fiery spots, which they conceive to be a sort of volcanoes in the body of the sun;* but Huygens, and others to the different members of an university, according to the arts and sciences taught there: as 1. Arts, 2. Theology. 3. Physic. And, 4. Civil law.

FACULTY is also used to denote the powers of the human mind, viz. understanding, will, memory, and imagination.

FÆCES, in chemistry, the gross matter, or sediment, that settles at the bottom after distillation, fermentation, &c.

FAGARA, *iron wood*, a genus of the monogynia order, in the tetrandria class of plants, and in the natural method ranking under the 43d order, dumosæ. There are 10 species, all natives of America, rising with woody stems more than 20 feet high.

FAGONIA, a genus of the monogynia order, in the decandria class of plants, and in the natural method ranking under the 14th order, gruinales. There are three species, herbaceous plants of Spain, Crete, and Arabia.

FAGRÆA, a genus of plants of the class and order pentandria monogynia. There is one species, a shrub of Ceylon.

FAGUS, the *beech-tree*, a genus of the polyandria order in the monœcia class of plants; and in the natural method ranking under the 50th order, amentaceæ. There are five species. The most remarkable are,

1. The sylvatica, or beech-tree, which rises 60 or 70 feet high, and has a proportionable thickness, branching upward into a regular head, with oval serrated leaves, with flowers in globular catkins, succeeded by angular fruit called mast.

2. The castanea, or chesnut-tree, has a large upright trunk growing 40 or 50 feet high, branching regularly round into a fine spreading head, with large spear-shaped serrated leaves

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feet, which are yellow. The length of the bird is two feet. This species is frequent in Russia and Siberia; and extends even to Kamtschatka. It is less generous and spirited than other eagles, and is perpetually making a plaintive noise. The Arabs used to train it for the chase; but its quarry was cranes and other birds, the more generous eagle being flown at antelopes and other quadrupeds.

8. The milvus, or kite, is a native of Europe, Asia, and Africa. This species generally breeds in large forests or woody mountainous countries. Its nest is composed of sticks, lined with rags, bits of flannel, rope, and paper. Its motion in the air distinguishes it from all other birds, being scarcely perceptible. Sometimes it will remain quite motionless for a considerable space; at others glide through the sky without the least apparent action of its wings; They inhabit the north of Europe, as high as Jalsberg, in the south of Norway; but do not extend farther. They quit Sweden in flocks at the approach of winter, and return in spring. Some of them winter about Astrakan, but the greater part are supposed to retire to Egypt, being seen in September passing by Constantinople in their way from the north; and again in April returning to Europe. They are observed in vast numbers about Cairo, where they are extremely tame, and feed even on dates, probably for want of other food.

9. The gentilis, or gentil falcon, inhabits the north of Scotland, and was in high esteem in the days of falconry. It makes its nest on rocks: it is larger than the goshawk; the head of a light rust colour, with black spots; the under side white tinged with yellow; the back white, the

ly the breast is of a yellowish white, spotted with rust-coloured spots, pointing downwards; the back of the head, neck, and coverts of the wings, are of a deep brown, edged with a pale rust-colour: the middle of the back covered with a white down. The tail is barred with black and ash-colour, and sometimes ferruginous.

12. The tinnunculus, or kestrel, breeds in the hollows of trees, in the holes of high rocks, towers, and ruined buildings. It feeds on field-mice, small birds, and insects; This is the hawk that we so frequently see in the air fixed in one place; and, fanning with its wings; at which time it is watching for prey. When falconry was in use this bird was trained for catching small birds and young partridges. The crown of the head and the greater part of the tail are of a light grey; the back and coverts of the wing red; spotted with black; the whole under side of a pale rust-colour spotted with black.

13. The sufflator, with yellowish wax and legs; the body is of a brownish white colour; and the covers of the eyes bony. It has a fleshy lobe between the nostrils: which, when angry or terrified, it inflates till his head becomes as big as his whole body. It is a native of Surinam.

14. The cachinnans, or laughing hawk, has yellowish legs and wax, and white eyebrows; the body is variegated with brown and white; and it has a black ring round the top of the head. It makes a laughing kind of noise, and is a native of America.

15. The columbarius, or pigeon-hawk of Catesby, weighs about six ounces. The bill is black at the point, and whitish at the base: the iris of the eye yellow: the base of the upper mandible is covered

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FALSE, in music, an epithet applied to certain chords, because they do not contain all the intervals appertaining to those chords in their perfect state.

FALSETTO, that species of voice in a man, the compass of which lies above his natural one, and is produced by constraint.

FALX, in anatomy, a process of the dura mater placed between the two hemispheres of the brain, and resembling a reaper's sickle.

FANTASIA, in music, the name generally given to a species of composition, supposed to be struck off in the heat of imagination.

FARINA *fœcundans*, in botanical language, the dust on the apices or antheræ of flowers; which being received into the pistil, or seed-vessel of plants, fecundates the rudiments of the seeds in the ovary, which otherwise would come to nothing.

FARRIERY, the art and profession of the farrier, comprehending the medical and surgical care of the horse, as well as that of manufacturing and fitting him with shoes. These men, as labourers of iron, were originally termed ferrers, or ferriers, from the Latin word *ferrum*, iron, and their craft ferriery; which word has since been changed to farriery. This term remains in general use to its fullest extent, and not inaptly; since notwithstanding the laudable attempts of many enlightened men our blacksmiths form a large majority of horse surgeons. Nor is this a defect peculiar to this country, but prevails throughout Europe.

On the establishment of a college, about sixteen years since, for the instruction of pupils in animal medicine, and surgery, we imported from France the term *veterinary*, and the veterinary art has been since substituted for farriery by most practitioners. The supposed derivation of this term veterinary is from the participle *vectum*, of the Latin verb *veo*, to carry; *quasi* vecterinary, thence applied to the care of animals of burden. See *Horse*.

FASCES, in Roman antiquity, axes bound up together with rods or staves, and carried before the Roman magistrates as a badge of their authority and office.

FASCIÆ, in astronomy, certain parts on Jupiter's body resembling belts or swaths. They are more lucid than the rest of that planet, and are terminated by parallel lines, sometimes broader, and sometimes narrower.

FASCINES, in fortification, faggots of small wood of about a foot diameter, and six feet long, bound in the middle, and at both ends.

FASCIOLA, in zoology, the *fluke or gourd worm*: a genus of insects of the order of vermes intestina; of which there are several species, as, 1. The hepatica, or liver fluke, which bears some resemblance to the seed of the common gourd. It is found in fresh waters, ditches, at the roots of stones, sometimes in the intestines, and often in the substance of the other viscera in quadrupeds. It often infests the liver of sheep, and on that account is called hepatica. Bags with salt for the sheep to lick is a good remedy. 2. The intestinalis or intestinal fluke, inhabits the intestines gana, is derived from an opinion of the superstitious Sicilians, that the spectacle is produced by fairies.

This singular meteor has been described by various authors; but the first who mentioned it with any degree of precision was father Angelucci, whose account is thus quoted by Mr. Swinburne in his Tour through Sicily: "On the 15th of August, 1643, as I stood at my window, I was surprised with a most wonderful delectable vision. The sea that washes the Sicilian shore swelled up and became, for ten miles in length, like a chain of dark mountains; while the waters near our Calabrian coast grew quite smooth, and in an instant appeared as one clear polished mirror, reclining against the ridge. On this glass was depicted, in chiaro-scuro, a string of several thousands of pilasters, all equal in altitude, distance, and degree of light and shade. In a moment they lost half their height, and bent into arcades, like Roman aqueducts. A long cornice was next formed on the top, and above it rose castles innumerable, all perfectly alike. These soon split into towers, which were shortly after lost in colonnades, then windows, and at last ended in pines, cypresses, and other trees, even and similar. This is the Fata Morgana, which for twenty-six years I had thought a mere fable."

To produce this deception, many circumstances must concur, which are not known to exist in any other situation. The spectator must stand with his back to the east, in some elevated place behind the city, that he may command a view of the whole bay; beyond which the mountains of Messina rise and darken the background of the picture. The winds must be hushed, the surface smooth, the tide at its height, and the waters pressed up by

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Feathers, wh
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ties with hair.
thequill is com
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FEATHER-M
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FEATHER-E
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FECIALES,
priests institute
sisting of twenty
the best familie
be arbitrators of
and peace, and
public faith.

FEE, in law.
cept that of the
feudum or fee;
by descent from
have purchase

en the lord, upon the
tenancy, reserves to
rent for which it was
ourth part of that farm

ural history, a name used
horns of insects.
ne of the five external sen-
of which, is every body that
y or solidity enough to
ce of our skin. It is neces-
feeling, that the nerves
all eminences, because they
moved by the impression
an uniform surface. It is
this structure, that we are
istinguish not only the size
bodies, their hardness and
also their heat and cold.
N, in logic, one of the six
e third figure of syllogisms,
first proposition is an uni-
ive, the second an universal
and the third a particular ne-

e, in zoology, a genus of the
class, belonging to the order of
generic is: front-teeth six, the
the ones equal; grinders three
side; tongue aculeated back-
ws retractile.
eo, lion. The lion is an inha-
sia. It is, however, in the in-
frica that he exerts his greatest
A lion of the largest size has
nd to measure about eight feet
ose to the tail, and the tail it-
four feet; the general colour is
wny, still paler or more inclin-
ite beneath; the head is large,
unded, the face covered with close
upper part of the head, the neck,
lders, coated with long shaggy
ming a pendant mane; on the
hair is short and smooth; the tail
minated by a tuft of blackish hair.
ness, which is smaller than the
estitute of the mane, and is of
claw beneath. The lion, like the
equently conceals himself in or-
spring on his prey, bounding to the
e of many feet, and seizing it with
ws. His strength is prodigious: it
ven been affirmed, that a single
of his paw is sufficient to break the
of a horse; and that he carries off
ase a middle-sized buffalo. The
ng of the lion when in quest of prey
bles the sound of distant thunder, and
re-echoed by the rocks and mountains
is the whole race of animals, and puts
to flight; but he frequently varies
voice into a hideous scream or yell:
is supposed to be destitute of a fine
l, and to hunt by the eye alone. The
is commonly said to devour as much,
will serve him for two or three days
when satiated to remain in his den,
hich he seldom leaves, except for the
urpose of prowling about for his prey.
is teeth are so strong, that he breaks the
ones with perfect ease, and often swal-
ows them together with the flesh; his
tongue, as in *other animals of this genus,*
furnished with reversed prickles; but
they are so large and strong in the lion,
as to be capable of lacerating the skin.
The lioness is said to bring forth in the
spring, in the most sequestered places, and to produce but one brood in the year. The young are four or five, which the parent nurses with great assiduity, and attends in their first excursions. When brought to Europe, lions have been known to breed even in a state of confinement; instances of which are recorded by some of the older naturalists. In the Tower of London examples of a similar nature have occurred. The young animals are scarcely so large as small pug dogs, and are said to continue at the teat about a year, and to be five years in coming to maturity.

The lion is said to be often hunted with dogs by the colonists about the Cape of Good Hope, and it is added that twelve or fifteen dogs are sufficient for the purpose. The lion, after being roused, runs for some time, then stops and shakes his mane, as if in defiance of the dogs, who, rushing all at once upon him, soon destroy him; two or three of the pack, however, generally falling victims to the first strokes of his paws.

2. Felis tigris, tiger, is a native of the warmer parts of Asia, and the Indian islands. Its colour is a deep tawny, the face, throat, and under side of the belly, being nearly white; the whole is traversed by long black stripes, forming a striking contrast with the ground-colour. About the face and breast the stripes are proportionally smaller than on other parts; the tail is annulated with black, and is shorter than the body.

In its general size the tiger is inferior only to the lion, and has been seen even larger.

Of so fierce a disposition is this animal as to surpass in rapacity every other, and it is therefore considered as the most dreadful scourge of the hotter regions of Asia. The lion is commonly supposed to prey in a less cruel manner. He is also, when taken in to a state of confinement, capable of being tamed, and rendered mild and placid to his keepers; but the tiger is not to be divested of his natural ferocity, and in confinement he generally exhibits all the symptoms of malignity. His method of seizing his prey is by concealing himself from view, and springing with a horrible roar on his victim, whic
he carries off and tears in pieces, afte
having first sucked the blood. The voic
of the tiger, in the act of springing on hi
prey, is said to be hideous beyond co
ception. Even a buffalo has been th
seized by a tiger and carried off with su
seeming ease, as to appear scarcely
impediment to the animal's flight. It
affirmed, that if the tiger happens to m
his aim, he does not pursue his prey, b
as if ashamed of his disappointment, r
off.

The tiger has been known to attack e
a lion, and both animals have perishe
the conflict. The tigress, produces
or five, at a litter: she is at all times
ous, but her rage rises to the utmost e
mity when robbed of her young,
then braves every danger, and p
her plunderers, who are often oblige
lease one to retard her motion
takes it up, and carries it to the
cover, but instantly returns, and
her pursuit, and when her hop

panther is principally found in Africa, and is to that country what the tiger is to Asia, with this alleviating circumstance, that it is supposed to prefer the destruction of other animals to that of man. Its manner of seizing its prey resembles that of the tiger, lurking near the sides of woods, &c. and darting forward with a sudden spring. It is of a highly ferocious nature, and scarcely to be tamed.

4. Felis leopardus, the leopard, is best distinguished from the panther by its paler yellow colour, its smaller size, and the closer disposition of its spots. The general length of this species from nose to tail, is four feet, of the tail two and a half. It is a native of Senegal and Guinea, as well as of many other parts of Africa: it also occurs in several parts of Asia. In its manners it resembles the panther.

A variety of this species, of a dusky black marked with spots of a deeper or more glossy black, and perfectly resembling in disposition those of the common leopard, is found in Bengal.

5 Felis jubata, the hunting leopard, is about the size of a large greyhound, and of a long make, with narrow chest, and long legs. It is a native of India, where it is said to be tamed, and used for the chase of antelopes and other animals. If it misses its prey, it returns to the call of its master.

6. Felis uncia, the ounce, is scarcely inferior in size to the leopard. Its colour is dull white, with a slight yellowish or tawny cast, and the whole is scattered over with spots and marking of black. In its general form the animal seems much allied to the leopard; it is supposed to have been the smaller panther of Oppian, and the panthera of Pliny. It is a native of several parts of Africa and Asia.

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FELLOWSHIP *with time*, usually called the *double rule of fellowship*, is worked thus: multiply each man's stock by the respective time he puts it in for, and add all the products; the total of which must be your first number through all the statings; the gain or loss the second, as before; and each man's particular stock, multiplied by its time, the third.

FELONY, in the general acceptation of law, comprises every species of crime which occasion at common law the forfuiture of lands or goods. This mostly happens in those for which a capital punishment is liable to be inflicted; for those felonies to which the benefit of clergy extends, were antiently punished with death in lay or unlearned offenders; though now by the statute law, that punishment is for the first offence remitted.

FELT, in commerce, a sort of stuff, deriving all its consistence merely from being full or wrought with lees and size, without either spinning or weaving. Felt is made either of wool alone, or of wool and hair.

FELSPAR. See *Lepidolite.*

FELUCCA, a little vessel with six oars, frequent in the Mediterranean.

FEME *covert*, a married woman, so called from being under the cover, protection and influence of her husband.

FEME *sole*, a single or unmarried woman.

FEMUR, *os femoris*, the thigh-bone, in anatomy.

FEN, a place overflowed with water, or abounding with bogs.

Fens are either made up of a congeries of bogs. or consist of a multitude of pools or lakes with dry spots of land intermixed like so many little islands.

FENCE, in country affairs, a hedge, wall, ditch, bank, or other inclosure made around gardens, woods, corn-fields, &c.

FENCING, the art of making a proper use of the sword, as well for attacking an enemy, as for defending one's self.

FENDUE *en pal*, in heraldry, a cross cloven down in pale, that is, from top to bottom, and the two parts set at some distance from each other.

FENESTRA, in anatomy, a term applied to two openings or foramina within the ear, distinguished by the names of the oval and the round fenestra.

FENNEL. See *Anethum.*

FEOD or **FEUD**, the right which a vassal hath in some lands or other things belonging to his lord to use the the same and take the profits thereof hereditarily, rendering to the lord such duties and services as belong to military tenure; the property of the soil always remaining to the lord. Hence came the feodal system.

FERÆ, in zoology, an order of quadrupeds, the distinguishing characters of which are, that all the animals belonging to it have fore teeth conic, usually six in each jaw; tusks longer; grinders with conical projections; feet with claws: *claws subulate*; food, carcases, and preying on other animals.

FERÆ naturæ. Animals of a wild nature are those in which a man has only a qualified and limited property, which sometimes subsists, and at other times does not.

is made are re-united in a different order, so that a new compound is formed having different qualities from those of the original mass. All the spontaneous changes which take place in vegetable substances after they are separated from the living plant.

FERRARIA, a genus of the triandria order, in the gynandria class of plants, and in the natural method ranking under the sixth order, ensatæ. There are two species, natives of the Cape of Good Hope and Mexico. The root of one of these species vegetates only every other year, and sometimes every third year.

FERRUGINOUS, any thing partaking of iron, or that contains particles of that metal.

FERULA, *fennel giant*, a genus of the digynia order, in the pentandria class of plants, and in the natural method ranking under the 45th order, umbellatæ. There are nine species, which are herbaceous perennials, rising from three to ten or twelve feet high, with yellow flowers. Assafetida is obtained from a species of ferula, though not peculiarly; being also produced by some other plants.

FESSE, in heraldry, one of the nine honourable ordinaries, consisting of a line drawn across the shield, and containing the third part of it.

FESTI *dies*, in Roman antiquity, certain days in the year devoted to the honour of the gods.

FESTINO, in logic, the third mood of the second figure of syllogisms, the first proposition whereof is an universal negative, the second a particular affirmative, and the third a particular negative.

FEVER, *febris*, in medicine, a diease, or rather class of diseases whose characteristic is a preternatural heat felt through the

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in music, a distance comprising
nic intervals, *i. e.* three tones

arp, is an interval consisting
mitones.

TE *numbers*, such as do or may
ome geometrical figure, in re-
hich they are always consider-
ngular, pentagonal, pyramidal,
ers.

, in conic sections, is the rect-
under the latus rectum and
in the hyperbola and ellip-

the diameter; the rectangle
diameter, and its proper para-
the ellipsis and hyperbola, call-
e of that diameter.

, in fortification, is the plan of
place, or the inferior polygon,
n the sides and angles are
led a regular, and when une-
egular figure.

, in geometry, is the superfici-
d between one or more lines,
inated rectilinear, curvilinear,
cording as the extremities are
by right lines, curve lines, or

, in grammar, is a deviation
tural rules of etymology, syntax,
, either for brevity, elegance,
.

, in logic, denotes a certain or-
position of the middle term in
m.

, in painting and designing, de-
nes and colours which form the
tion of any animal, but more
of a human being.

, in rhetoric, is a manner of
fferent from the ordinary and
, and more emphatical, ex-
passion, or containing a beauty.

D, in music, is a term applied
scendant, which, instead of
e by note with the bass, con-
e and florid melody.

R, or *filazer*, an officer of the
mon-pleas, so called because
se writs whereon he makes
. There are fourteen of them in
al divisions and counties, and
out all writs and processes up-
writs, issuing out of chance-

, a genus of the polygamia ne-
der, in the syngenesia class of
in the natural method ranking
49th order, compositæ. There
species, commonly known by
cudweed, natives of most parts

NTS, *vegetable*, form a sub-
reat use in the arts and manu-
urnishing thread, cloth, cordage,
ese purposes the filamentous
cannabis and linum, or hemp
re employed among us. But
egetables have been employed
countries for the same uses.
n destroys the pulpy matter and
tough filaments entire; *by ma-*
leaf of a plant in water, we
e flexible fibres which con-
sis of the ribs and minute
ich now form a skeleton of

FILARIA, a genus of insects of the order intestina. There are several species, infesting different animals and insects. The medinensis is the most remarkable species; it inhabits the Indies, and is frequent in the morning dew, whence it enters the feet of the slaves, and creates the most troublesome itchings, accompanied with inflammation and fever,

FILE, among mechanics, a tool used in metal, &c. in order to smooth, polish, or cut with.

This instrument is of iron, or forged steel, cut in little furrows, with chisels, and a mallet, in a certain direction, and of a certain depth, according to the grain or touch required.

Mr. Nicholson has obtained a patent for machinery for the manufacture of files; which consist, 1. Of a carriage in which the file is fixed and moved for the purpose of receiving the strokes of a cutter or chisel. 2. The anvil by which the file is supported beneath the part which receives the stroke. 3. The regulating gear by which the distance between the strokes is governed: and 4. The apparatus for giving the stroke or cut. Those four parts are supported by a frame of wood or metal, according to the nature of the work to be performed.

By this machinery a blind man can cut a file with more exactness than the most skilful workman in the ordinary way.

FELIX, an order of the cryptogamia class of plants, comprehending the fern, horse-tail, adder's tongue, maiden-hair, spleenwort, polypody, &c.

FILLET, in heraldry, a kind of bordure, containing only a third or fourth part of the breadth of the common bordure.

FILTER, or FILTRE, in chemistry, a strainer through which any fluid is passed, to separate the gross particles and render it limpid.

FILTERING basons, &c. are either natural or artificial, for the purpose of purifying water. Natural filtres are found in rocks, mountains, beds of sand, gravel, &c. Artificial filtering-basons consist of equal parts of pipe-clay, and coarse sand. They should be three-quarters of an inch thick.

FILTRATION, in chemistry, is sifting through the pores of paper, flannel, or fine linen or sand, pounded glass, or porous stones, and the like; but it is used only for separating fluids from solids or particles that may happen to be suspended in them, and not chemically combined with the fluids.

FIN, in natural history, a well known part of fishes consisting of a membrane supported by rays, or little bony or cartilaginous ossicles.

FINALE, in music, is a word signifying the last composition performed in any act of an opera, or part of a concert.

FINANCE, the œconomy of the public revenue and expenditure of nations.

The English system of finance rests on the produce of the various taxes which have been imposed at different periods, the aggregate amount of which, after deducting the expences of collection, together with a few small articles which cannot properly be called taxes, forms the whole of the public income.

fashioned into what they call a bloom, or square bar.

FINTO, in music, a term applied to the preparation for a cadence which is not executed: when the performer having done every thing requisite to a full close, instead of falling on the final, passes to another note, or introduces a pause.

FIRE, in philosophy, is that subtle invisible cause by which bodies are expanded and become hot to the touch, fluids are rarefied into vapour, and solids become fluid. It seems likewise to be the chief agent in nature, on which animal and vegetable life immediately depend, and without which it does not appear that nature could possibly subsist.

FIRE, *wild*, a kind of artificial or factitious fire, which burns even under water. It is composed of sulphur, pitch, nitre and various other combustible materials; and is very hard to extinguish. Chemistry, however, has supplied a still more destructive kind of wild-fire, in the union of nitrous acid with oil of turpentine. These two liquids separately are perfectly cold; but when suddenly mixed, produce a flame not easily extinguished.

FIRE-PLACE. Economical fire-places should be constructed on the following principles: 1. To place the grate as near the floor as may be. 2. To bring it as forward as may be, consistently with the proper situation of the throat of the chimney, which ought to be directly over the fire, and not larger than sufficient to give free passage at all times to the smoke. 3. The mantlepiece should be as low as possible without suffering from the heat, or obstructing the proper radiation of it into the room. By these means a much greater volume of heated air is retained in a room of equal size than by high grates and large openings.

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of them with an air-bladder, by
ction and dilatation of which, they
or sink themselves at pleasure.
destitute of eyelids, external
, arms and legs. Their food is
nsects, dead bodies, lesser sea-
sea-plants.

neric character is taken from the
the body, covering, structure,
nd parts of the head; but princi-
m the branchiostegous membrane.
ific character is taken from the
rs fins, spines, lateral lines, digi-
pendages, tail and colour. The
ies is known by numbering the
ic circles in a transverse section
ckbone, or the concentric circles
ales. The characters of the six or-
(1.) apodal, without ventral
) jugular, ventral fins before the
: (3.) thoracic, ventral fins be-
pectoral: (4.) abdominal, ven-
ehind the pectoral: (5.) branchi-
gills destitute of bony rays: (6.)
terygiousgillscartilaginous These
r orders Linnæus refers to the
hibia nantes; so that he admits
rders: under which he enume-
genera, and about 400 species.

n a ship, a plank or piece of tim-
ed to a ship's mast or yard to
n *it.*

, in heraldry, are the emblems of
d watchfulness. In blazoning
ose borne feeding, should be
evouring: all fishes borne up-
having fins, should be blazoned
and those borne transverse the
n, must be termed naiant.

Y, a place where great num-
h are caught.

ncipal fisheries for salmon, her-
krel, pilchards, &c. are along the
England, Scotland and Ireland;
n the banks of Newfoundland;
s, about Greenland; and for
the East and West Indies.

ery, in law, or an exclusive right
in a public river, is a royal
; and differs from a several of
ecause he that has a several fish-
also be the owner of the soil,
a free fishery is not requisite. It
lso from the common fishery, in
ee fishery is an exclusive right,
on is not so; and therefore, in
ery, a man has a property in the
re they are caught; in a common
ot till afterwards.

RE *of the bones*, in surgery, is when
divided either transversely or
nally, not quite through but
by an external force.

LA, in surgery, a deep, narrow
us ulcer, generally arising from
s.

LARIA, pipe fish, a genus of the
dominales. The species are:
laria tabacaria, or slender fistu-
his grows to the length of three or
and is of the shape of an eel, the
ut nine inches long; the eyes are
ovate, with a blue pupil and *sil-*
marked *on the fore and hind part*
our; the skin smooth and of a
r marked by blue spots, with
s intermixed. The appear
ll is singular, being deeply

forked, while from the middle of the furcature springs a longbristle process, resembling whalebone, and tapering to a point. A variety has been observed by Dr. Bloch, in which this part was double, and the snout serrated on each side.

This species lives chiefly on the smaller fishes, sea-insects, and worms.

2. Fistularia Chinensis, or Chinese fistularia, in its general shape resembles an eel, but the body is thicker in proportion than in the preceding species: it is a native of the Indian seas, preying on worms, sea-insects, &c.

3. Fistularia paradoxa, paradoxical fistularia, is a small species, from two to four inches in length. It is a native of the Indian seas.

FITCHEE, in heraldry, a term applied to a cross, when the lower end of it is sharpened into a point.

FIXED *bodies*, in chemistry, are those which bear a considerable degree of heat without evaporating, or losing any of their weight.

FLACOURTIA, a genus of plants of the class and order dioecia polyandria. There is one species, a small tree of Madagascar, bearing an eatable fruit resembling a plum.

FLAG, a general name for colours, banners, ensigns, &c.

The fashion of pointed or triangular flags, came from the Arabs, or Saracens, upon their seizing of Spain, before which time all the ensigns of war were stretched, or extended on cross pieces of wood.

Flag, is more particularly used at sea, for the colours, antients, &c. borne on the top of the masts to notify the person who commands the ship, of what nation it is, and whether it is equipped for war or trade.

The admiral in chief carries his flag on the main top; the vice-admiral on the fore-top; and the rear-admiral on the mizen top.

FLAG-OFFICERS, those who command the several squadrons of a fleet, such as the admirals, vice-admirals, and rear-admirals.

FLAGS, in falconry, are the feathers in a hawk's wing, near the principal ones.

FLAGELLARIA, a genus of the hexandria monogynia class and order of plants, of which there are two species, shrubs of the East Indies.

FLAGEOLET, a little flute, used chiefly by shepherds, and country people.

FLAIL, an instrument for thrashing corn, consisting of the following parts: 1. The hand-staff, or piece held in the thrasher's hand. 2. The swiple, or that part which strikes out the corn. 3. The caplins, or strong double leathers, made fast to the tops of the hand-staff and swiple. 4. The middlehand, being the leather-thong, or fish-skin, that ties the caplins together.

FLAME, in physiology: when oxygen gas is decomposed slowly, the heat is *imperceptible*, because the caloric is *dissipated* as soon as generated. When the *decomposition* goes on faster, the bodies *concerned* become sensibly warm. A quicker decomposition of the gas heats the bodies so as to render them red hot,

FLANKED, in heraldry, is used by the French to express our parti per saluer.

FLAT, in music, a character which before a note signifies that the note is to be sung or played half a tone lower than its natural pitch. A double flat, is a character compounded of two flats, signifying that the note before which it is placed is to be sung or played two semitones lower than its natural pitch.

FLAX. See *Linum*.

FLEAM, in surgery and farriery, an instrument for letting a horse or other animal blood.

FLEECY-HOSIERY, a useful kind of manufacture, in which fine fleeces of wool are interwoven into a cotton piece of the common stocking texture; for making stockings, socks, waistcoats, and other clothing, for persons afflicted with complaints requiring warmth, and for common use in cold climates.

FLEET, commonly implies a company of ships of war, belonging to any prince or state; but sometimes it denotes any number of trading-ships, employed in a particular branch of commerce.

FLESH, in anatomy, a fibrous part of an animal body, soft and bloody, being that of which most of the other parts are composed, and by which they are connected together: or, more properly, it is that part of the body where the blood-vessels are so small, as only to retain blood enough to preserve their colour red.

FLEVILLEA, a genus of the hexandria order, in the diœcia class of plants.

FLEXIBLE, in physics, a term applied to bodies capable of being bent or diverted from their natural figure or direction.

FLEXION, in anatomy, is applied to the motion by which the arm or any other member of the body

en lay the plant and its
the sheets of paper dou-
ding out the leaves and
possible. If the stalk
be pared or cut in half,
flat; and if it is woody,
and only the bark left.
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y serve to complete any
When all is prepared, lay
f paper over the plant,
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em lie there two hours.
ixture of equal parts of
andy: shake these toge-
he flowers are taken out
of the plates, rub them
a camel's-hair pencil
uor; then lay them up-
paper, and covering
ther sheets, press them
d other papers with a
the wet is dried away.
s thus prepared, take the
of gum-dragon; put this
l water, and let it stand 24
a fine hair-pencil in this
it go over the backs of
ay them carefully on a
e paper fairly expanded,
own with more papers
n the gum-water is fix-
e and papers be removed,
work is finished. The
their verdure and the
r natural colours: care

FLUATS, in chemistry, salts first discovered by Scheele and distinguished by the following properties. When sulphuric acid is poured upon them, they emit acid vapours of fluoric acid, which corrode glass. When heated, several of them phosphoresce. They are not decomposed by heat, nor altered by combustibles. They combine with silica by means of heat. Most of them are sparingly soluble in water.

FLUENT, in fluxions, the flowing quantity, or that which is continually increasing or decreasing,

FLUID, in physiology, an appellation given to all bodies whose particles easily yield to the least partial pressure, or force impressed.

FLUIDITY, that state or affection of bodies which exhibits them in a liquid form.

The theory of Dr. Black which is confirmed by experiments, is that when a solid body is converted into a liquid, a much greater quantity of heat enters into it than is perceptible immediately after by the thermometer. This great quantity of heat does not make the body apparently warmer, but it must be thrown into it in order to convert it into a liquid; and this great addition of heat is the principal and most immediate cause of the fluidity induced. On the other hand, when a liquid body assumes the form of a solid, a very great quantity of heat leaves it without sensibly diminishing its temperature; and the state of solidity cannot be induced without the abstraction of this great quantity of heat. Or, in other words, whenever a solid is converted into a fluid it combines with a certain dose of corroded, and even pierced with holes. Nothing more was known concerning fluor till Scheele published his experiments by which he proved that it is composed chiefly of lime and a particular acid, which has been called fluoric acid.

The composition of fluoric acid is equally unknown with that of muriatic acid. Mr. Henry tried in vain to decompose it by means of electricity. it is always obtained from fluor spar, in which mineral it is found in abundance.

The most singular property of fluoric acid is the facility with which it corrodes siliceous bodies, especially when hot, and the ease with which it holds silica in solution even in the state of gas. This affinity for silica is so great that the thickest glass vessels cannot resist its action.

FLUSTRA, a genus of insects of the order zoophyta; an animal of the polypus kind, proceeding from porous shells; stem fixed, foliaceous, membranaceous, consisting of numerous rows of cells united together like a mat. There are many species.

FLUTE, *fistula*, an instrument of music, of the wind kind. The tones or notes are changed by stopping and opening the holes disposed for that purpose along its side. The antient fistulæ, or flutes, were made of reeds, afterwards of wood, and last of metal.

FLUTE, *German*, is an instrument different from the common flute; instead of being put into the mouth to be played, the end is stopt with a plug and the lower lip is applied to a hole about two inches and a half, or three inches, distant from the end. It is perforated with holes, the lowest of which is stopt and opened by the little finger's pressing on a brass, or silver key.

t over it: thus, the fluxion of x is represented by $\dot{x}$ and that of y by $\dot{y}$. And, these fluxions are often variable quantities, the velocities with which rease or decrease, are the fluxions of the former fluxions, which may be cond fluxions, and are denoted by the same letters with two dots, as

n the same manner the fluxions of these are called third fluxions, and denoted by e letters with three dots, as $\dddot{x}$, $\dddot{y}$; and so on.

octrine of fluxions consists in solving these two problems, 1. From the fluent, ble flowing quantity given, to find the fluxion; which constitutes what is called ct method of fluxions. 2. From the fluxion given, to find the fluent, or flowing r; which makes the inverse method of fluxions.

Method of Fluxions.—The doctrine of this part of fluxions is comprized in les:

nd the fluxion of a simple variable quantity, place a dot over it; thus, the of x is $\dot{x}$ and of y, $\dot{y}$. Again, the fluxion of the compound quantity $x+y$, is

nd the fluxion of a given power of a variable quantity, multiply the fluxion ot by the exponent of the power, and the product by that power of the same ose exponent is less by unity than the given exponent. This rule is expressed efly, in algebraical characters, by $nx^{n-1}\dot{x}$ = the fluxion of x^n. Thus, the of x^3 is $\dot{x}\times 3\times x^2 = 3x^2\dot{x}$; and the fluxion of x^5 is $\dot{x}\times 5\times x^4 = 5x^4\dot{x}$.

 find the fluxion of the product of several variable quantities, multiply the of each, by the product of the rest of the quantities; and the sum of the pro- will be the fluxion sought. Thus, the fluxion of xy is $\dot{x}y+\dot{y}x$; that of xyz, is $\dot{x}yz + \dot{z}xy$; and that of $vxyz$, is $\dot{v}xyz+\dot{x}vyz+\dot{y}vxz+\dot{z}vxy$. Again, the fluxion of $\times\overline{b-y} = ab+bx-ay-xy$, is $b\dot{x}-a\dot{y}-\dot{x}y-\dot{y}x$.

find the fluxion of a fraction, from the fluxion of the numerator multiplied by ominator, subtract the fluxion of the denominator multiplied by the numerator, ide the remainder by the square of the denominator. Thus the fluxion of

$$\frac{\dot{y}x-xy}{y^2};\text{ that of }\frac{x}{x+y},\text{ is }\frac{\dot{x}\times\overline{x+y}-\overline{\dot{x}+\dot{y}}\times x}{\overline{x+y}|^2}=\frac{y\dot{x}-\dot{x}y}{\overline{x+y}|^2};\text{ and that of}$$

$$\frac{x+z}{x+y},\text{ or }1+\frac{z}{x+y},\text{ is }\frac{\dot{z}\times\overline{x+y}-\overline{\dot{x}+\dot{y}}\times z}{\overline{x+y}|^2};\text{ and so of others.}$$

 examples hitherto given, each is resolved by its own particular rule: but in t follow, the use of two or more of the above rules are requisite: thus (by 2. the fluxion of x^2y^2 is found to be $2x^2y\dot{y}+2y^2x\dot{x}$; that of $\frac{x^2}{y^2}$, is found (by and 4.) to be $\frac{2y^2x\dot{x}-2x^2y\dot{y}}{y^4}$; and that of $\frac{x^2y^2}{z}$, is (by 2. 3. and 4.) found to

$$\frac{\overline{\dot{y}+2y^2x\dot{x}}\times z-x^2y^2\dot{z}}{z^2}.$$

en the proposed quantity is affected by a co-efficient, or constant multiplica- fluxion found must be multiplied by that co-efficient; thus, the fluxion of $5x^3$ is $15x^2\dot{x}$: for the fluxion of x^3 is $3x^2\dot{x}$, which multiplied by 5 gives $15x^2\dot{x}$. And same manner, the fluxion of ax^n will be $nax^{n-1}\dot{x}$.

ng explained the manner of determining the first fluxions of variable quantities proceed to the second, third, &c. fluxions. We have observed, that the second of a quantity is the fluxion of the first fluxion; and by the third fluxion is meant xion of the second; the fourth, of the third; and so on. The fluxions, therefore, y order, are only the measures of the velocities by which their flowing quantities, fluxions of the immediately preceding order, are generated. Hence a second always shews the *rate of the increase or decrease* of the first fluxion, and the fourth, &c. *fluxions differ in nothing, except* their order and notation, from the *; and therefore, they are also* determinable in the same manner, by the same fluxion of $\ddot{x}$ by $\dddot{x}$, and so on of the higher orders,

Here follow some examples, in which the root x (o

with a variable velocity. Thus, the fluxion of x^3 be

$3x^2 \times \dot{x}$, considered as a rectangle, will (by rule 3.

$\ddot{x} = 6x\dot{x}^2 + 3x^2\ddot{x}$; which is the second fluxion of

last found, we shall in like manner get $6\dot{x} \times \dot{x}^2$

(or $6\dot{x}^3 + 18x\dot{x}\ddot{x} + 3x^2\dddot{x}$) for the third fluxion of x^3. Th

$\ddot{y} = n \times \overline{n-1} \times x^{n-2}\dot{x}^2 + n\ddot{x}x^{n-1}$; and if z^2

and so of others.

Observe, that the fluxions of all kinds and orders, a
may be generated together, with their respective
time.

Inverse Method of Fluxions, or the manner of determi

As there is no method for deducing the fluent from
investigation; so it is impossible to lay down rules
than those particular ones that from the direct method

ing quantities; thus, the fluent of $2x\dot{x}$ is known to be

thod, the fluxion of x^2 is found to be $2x\dot{x}$; but the flue

expression has been discovered that produces $y\dot{x}$ for
the rules for finding fluents of given fluxions.

1. To find the fluent of any simple fluxion, write the

the fluent of $\dot{x}$ is x.

2. To assign the fluent of any power of a variable qua
of the root; first divide by the fluxion of the root, add

power, and divide by the exponent so increased; for di

by $\dot{x}$, it becomes nx^{n-1} ; and adding 1 to the expone nd that of $\overline{a^m+z^m}^n \times z^{m-1}\dot{z} = \frac{\overline{a^m+z^m}^{n+1}}{m\times\overline{n+1}}$.

g the fluents of given fluxions, consider whether the flowing quantity addition or subtraction of some constant quantity, to render it complete; ent of $nx^{n-1}\dot{x}$ may be represented by x^n or by $x^n \pm a$; for a being a ntity, the fluxion of $x^n \pm a$, as well as of x^n, is $nx^{n-1}\dot{x}$.

ppears, that the variable part of a fluent only can be assigned by the thod, the constant part being only assignable from the particular nature of To do this, the best way is to consider how much the variable part of st found, differs from the truth, when the quantity which the whole fluent ress is equal to nothing; then that difference, added to, or subtracted from, part, will give the correct fluent. To make this plainer let $\dot{y} = \overline{a+x}^3$ we first find $y=\frac{\overline{a+x}^4}{4}$; but when $y=0$, then $\frac{\overline{a+x}^4}{4}$ becomes $=\frac{a^4}{4}$ ypothesis, is then $=0$: therefore $\frac{\overline{a+x}^4}{4}$ always exceeds y by $\frac{a^4}{4}$; and so roperly corrected, will be $y=\frac{\overline{a+x}^4-a^4}{4} = a^3x+\frac{3a^2x^2}{2}+ax^3$

, let $\dot{y}=\overline{a^m+x^m}^n\times x^{m-1}\dot{x}$: here we first have $y=\frac{\overline{a^m+x^m}^{n+1}}{m\times\overline{n+1}}$; $=0$, the latter part of the equation becomes $\frac{\overline{a^m}^{n+1}}{m\times\overline{n+1}}=\frac{a^{mn+m}}{m\times\overline{n+1}}$; whence or fluent, properly corrected, is $y=\frac{\overline{a^m+x^m}^{n+1}-a^{mn+m}}{m\times\overline{n+1}}$. Hitherto oth supposed equal to nothing, at the same time; which will not always thus, for instance, though the sine and tangent of an arch are both equal hen the arch itself is so; yet the secant is then equal to the radius. It e be proper to add some examples, in which the value of y is equal to n that of x is equal to any given quantity a. Thus let the equation $\dot{y}=$ posed; whereof the fluent first found is $y=\frac{x^3}{3}$; but when $y=0$, then the hypothesis; therefore the fluent, corrected, is $y=\frac{x^3-a^3}{3}$. Again, $x^n\dot{x}$; then will $y=\frac{x^{n+1}}{n+1}$; which, corrected, becomes $y=\frac{a^{n+1}-x^{n+1}}{n+1}$.

$\dot{y}=\overline{c^2+bx^2}^{\frac{1}{2}}\times x\dot{x}$; then, first, $y=\frac{\overline{c^2+bx^2}^{\frac{3}{2}}}{3b}$: therefore, the fluent

$$y=\frac{\overline{c^2+bx^2}^{\frac{3}{2}}-\overline{c^2+ba^2}^{\frac{3}{2}}}{3b}$$

the fluents *of such expressions as involve two* or more variable quantities *such fluxion, its respective flowing quantity*; and adding all the terms to *the sum by the number of terms*, and the quotient will be the fluen proposed to find the fluent of $\frac{}{a}$

fluxion into an infinite series, by dividing $a\dot{x}$ by

$+\frac{x^2\dot{x}}{a^2}+\frac{x^3\dot{x}}{a^3}+\frac{x^4\dot{x}}{a^4}+$, &c. Now the fluen

found by the foregoing rules to be $x+\frac{x^2}{2a}+\frac{}{3}$

Again, to approximate the fluent of $\frac{\overline{a^2-x^2}}{\overline{c^2-x}}$

$\frac{\overline{a-}\,^{\frac{1}{2}}}{\overline{c^2-x}\,^{\frac{1}{2}}}$, expressed in a series, to be $\frac{a}{c}+\frac{}{2c}$

$x^4+\overline{\frac{5a}{16c^7}-\frac{3}{16ac^6}-\frac{1}{16a^3c^3}-\frac{1}{16a^5c}}\times x^6+$, &

x^n $\dot{x}$ and the fluent taken by the rules above laid

$\times\frac{x^{n+3}}{n+3}+\overline{\frac{3a}{8c^5}-\frac{1}{4ac^3}-\frac{1}{8a^3c}}\times\frac{x^{n+5}}{n+5}+$

+, &c.

Examples, to shew the usefulness of fluxions. L given right line AB (into two such parts, AC, CB, that the greatest possible. Let AB $=a$, and let the part motion of C towards B) be denoted by x. Then BC ectangle or $ax \times BS = \frac{abx - bx^2}{a}$, the fluxion of which is $\frac{ab\dot{x} - 2bx\dot{x}}{a}$, and ut equal to O, we have $a = 2x$, and $x = \frac{a}{2}$. Hence the greatest inscribed e is that, the altitude of which is half the altitude of the triangle.

f all right-angled plain triangles, containing the same given area, to find that ch the sum of the legs AB + BC is the least possible. Let one leg AB be denoted nd the area of the triangle by a, then the other leg will be $\frac{2a}{x}$, the fluxion of s $\dot{x} - \frac{2a\dot{x}}{x^2} = 0$: therefore $x^2 = 2a$, and $x = \sqrt{2a}$. Whence BC $= \left(\frac{2a}{x}\right) = \sqrt{2a}$.

determine the dimensions of the least isosceles triangle, ACD, fig. 4, that can cribe a given circle. Let the distance OD of the vertex of the triangle from re of the circle be called x, and the remaining part OB, or radius, be repre- by a; then if OS perpendicular to DC be drawn we have DS $= \sqrt{x^2 - a^2}$: and C : OS :: DB : BC, we have BC $= \frac{a \times \overline{x+a}}{\sqrt{x^2 - a^2}}$, which, multiplied by BD or ives $\frac{a \times \overline{x+a}^2}{\sqrt{x^2 - a^2}}$ for the area of the triangle. Which being a minimum, its is also a minimum, consequently $\frac{\overline{x+a}^4}{x^2 - a^2}$, or its equal $\frac{\overline{x+a}^3}{x - a}$, a minimum e fluxion of which is $\frac{3\dot{x} \times \overline{x+a}^2 \times \overline{x-a} - \dot{x} \times \overline{x+a}^3}{\overline{x-a}^2} = 0$; this ivided by $\frac{\dot{x} \times \overline{x+a}^2}{\overline{x-a}^2}$, we get $3 \times \overline{x-a} - \overline{x+a} = 0$, whence $2x = 4a$, $= 2a$. Therefore OD is equal to 2OS, and DC = 2BC = AC; and so the triangle hen the least possible, is equilateral.

ain, suppose it were required to find the solid contents of a spheroid, AFBH g. 5.) Let the axis AB, about which the solid is generated, be $= a$, the ra and the other axis FH of the generating ellipsis $= b$; then, from the property llipsis, we have $a^2 : b^2 :: AD \times BD\ (x \times \overline{a - x}) : DE^2\ (y^2)$. Hence $y^2 = \frac{b^2}{a^2} \times \overline{ax - xx}$; and the fluxion of the solid $\dot{s}\ (= py^2\dot{x}) = \frac{pb^2}{a^2} \times \overline{ax\dot{x} - x^2\dot{x}}$ and the so $= \frac{pb^2}{a^2} \times \overline{\frac{1}{2}axx - \frac{1}{3}x^3}$ = the segment AIE; which, when AD $(x) =$ AB mes $\left(\frac{pb^2}{a^2} \times \overline{\frac{1}{2}a^3 - \frac{1}{3}a^3}\right) \frac{1}{6}pab^2$ = the content of the whole spheroid. b (FH) be taken $= a$ (AB), we shall also get $\frac{1}{6}pa^3$ for the true content of e, whose diameter is a. Hence a sphere or spheroid is $\frac{2}{3}$ of its circum- ylinder: for the area of the circle FH being expressed by $\frac{pb^2}{4}$, the content linder, *whose diameter is FA, and altitude AB*, will be $\frac{pb^2a}{4}$; of which $\frac{1}{6}pab$ *y two-third parts.*

longest axis, on which as centres the figure is described.

The focus of an hyperbola, is that point in the axis through which the latus rectum passes.

The focus of a parabola, is a point in the axis within the figure, distant from the vertex one fourth part of the latus rectum.

FOCUS, in optics, is the point in which the rays are collected, after they have undergone reflection or refraction.

FODDED, or *Fother*, in mining, a measure containing twenty-two hundred and a half weight, but in London it is twenty hundred.

FOG, or *Mist*, a meteor, consisting of condensed vapours, floating near the surface of the earth. If the vapours, which are raised plentifully from the earth and waters, at their first entrance into the atmosphere meet with cold enough to condense them to a considerable degree, their specific gravity is increased, and thus they will be stopped from ascending, and either return back in form of dew or of drizzling rain, or remain suspended some time in the form of a fog.

FOIL, among glass-grinders, a sheet of tin, with quicksilver, &c. laid on the backside of a looking-glass, to make it reflect. Among jewellers, it is a thin leaf of metal placed under a precious stone, to increase its brilliancy, or give it an agreeable and different colour. These foils are made either of copper, gold, or gold and silver together.

FOLIAGE, in architecture, is used for the representations of such flowers, leaves, branches, &c. as are used for enrichments on capitals, friezes, pediments, &c.

FOLIATE, in the higher geometry, a name given by de Moivre

and tin half
and tin into
muth, and
stand till it is
quicksilver
glass globe,
make a pape
hole of the gl
you can, pour
move it abou
where.

FOMAHAU
the first magn
Aquarius.

FOMENTA
bathing any pa
liquor.

FONTANES
the diandria m
There is only o
ria.

FONTINAL
the natural ord
gamia class of
cies, all natives
the brinks of r
of trees. The
antipyretica, wi

FOOT, in the
metre of measu
number of long
feet are common
of which some a
of two or three
called disyllabic
are compound, c
and are there
feet.

Foot, is also a
of twelve inches
the foot into ten
ten lines.

FOOT, *square*,

aw, a judgment
ived, or put out,

-*staff*, an instru-
ea for taking the
or stars.
e buying or bar-
le, or other mer-
fore it comes to
sold; or as it
seas, or other-
or creek, of this
again at a higher

ll endeavours to
erchandize, and
a tendency there-
g false rumours,
in a market be-
ir, or by buying
me thing in the
such devices, are
ble by fine and

nishment annex-
act or negligence
s, tenements, or
y he loses all his
y go to the party
ce for the wrong
the public toge-
ined.
an insect of the
wings of this in-
nt, and are con-
small sheaths in
are very large in
ial. transparent.

where the pigs are worked into gross iron, and prepared for the second, called the chafery, where it is wrought into bars.

FORGERY, the crime of affixing the signature of another to any writing for the purpose of defrauding, which is capital felony.

Forgery may be committed by making a mark in name of another person. Indorsing a bill of exchange with a fictitious name is forgery; though the use of such name was not essential to the negociation.

FORGING, the beating or hammering iron on the anvil after making it red hot in the forge.

FORM, (*printer's*) an assemblage of letters, words, and lines, disposed into pages by the compositor, and from which the printed sheets are taken.

FORM, *of a series*, in algebra, that affection of an indeterminate series arising from the different values of the indices of the unknown quantity.

FORMA PAUPERIS, in law, is when any person having cause of suit and cannot support the charge, upon affidavit that he is not worth five pounds, the court admits him to sue without fees or paying costs.

FORMEDON, in law, a writ that lies for a person who has a right to lands or tenements by virtue of an entail.

FORMIC ACID, in chemistry, an acid which exists in the formica rufa, or red ant. This acid, which tinges blue flowers red, was formerly considered as possessed of peculiar properties, and thence called formic acid, but it is now found to the troops for the sustenance of the hores.

FORSKOHLEA, a genus of the pentagynia order and decandria class of plants. There are three species natives of Egypt, the Cape, and other parts of Africa.

FORSTERA, a genus of the triandria order in the gynandria class of plants. There is only one species an herbaceous plant of New Zealand.

FORT, a small fortified place environed with a moat, rampart and parapet. Forts are of different figures and magnitudes. Some are fortified with bastions and others with demibastions. See the following articles.

FORTIFICATION, is regular or irregular. The regular is that built in a polygon, the sides and angles of which are all equal, being commonly about a musket-shot from each other. Irregular fortification, on the contrary, is where the sides and angles are not uniform, equidistant, or equal.

I. *Of regular Fortification.*

Authors in general agree as to the form, but they differ in respect to the construction of the parts. The chief of those who have written on this art, are Pagan, Blondel, Vaubar, Coborn, Muller, Scheiter, Robins, Belidor, and marshal Saxe.

The views of the engineer are not to be confined to the mere art of fortification. He must be able to take advantage of natural strength and position, particularly of chains of mountains and streams of water.

According to Pagan, fortification consists of three different sorts, viz. the great, the mean, and the little; the principal dimensions of which are contained in the following

The great Fortification.		The
For Squares.	For all other Polygons.	For Squares

Blondel fort
gon: he estal
tion; the gre
is 200 toises,
cause he will
exceed 140 to
musket-shot,
to increase th
begins by the
may be found
the angle of t
15 degrees to
der.

Vauban's m
mean, and gre
in the constru
in that of town

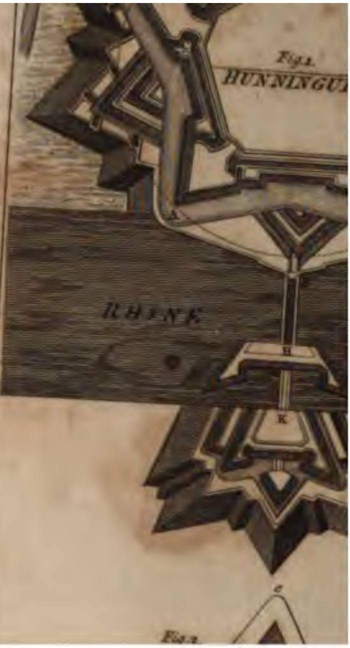
Fig.1.
HUNNINGU
A
RHINE
H
K
e
Fig.2.

TABLE.

							mall.				Mean.		Great.	
Side of Polygon	80	90	100	110	120	110	140	150	160	170	180	190	200	250
Perpendicular	10	11	12½	14	15	16	20	21	23	25	30	31	25	22
Faces bastion	22	5	28	30	33	35	40	42	45	47	50	53	55	60
Cap. of ravel.	25	28	30	35	38	40	45	50	50	52	55	55	60	50

irst vertical column are the num-
es-ing the lengths of the exterior
n 80 to 250.
second, the perpendiculars an-
o these sides.
third, the lengths of the faces of
ns; and in the fourth, the lengths
itals of the ravelins.
's method is divided into little,
d great; and in all three the ex-
e is 200 toises; the perpendicu-
little is 30, that of the mean 35,
reat 40: the faces of the first 70,
d 70, and the third 55 toises.
's method is divided into the
o, and small. The exterior side
n for the great sort is 200 toi-
an 180, and the small 160.

The line of defence in the first is 140 toises, the second 130, and the third 120. This line is always razant. All the other lines are fixed at the same length for all polygons, whose structure chiefly depends upon the knowledge of the exterior side, of the capital, or of the flanked angle.

TABLE of CAPITALS and FLANKED ANGLES.

Polygons.	IV	V	VI	VII	VIII	IX	X	XI	XII
The flanked angles in the 3 sorts of fortification	deg. 64	76	84	90	95	97	99	101	103
Capital for the great sort	toise 46	49	51	52	53	54½	56½	58	59
Capital for the mean sort	42	41½	46½	48½	50	51	52½	54	54
Capital for the small sort	39	41½	45½	45	46	47½	48½	50	50½

Pagan makes the flank perpendicular to the line of defence, and by this means the flank so raised covers the face of the opposite bastion; but notwithstanding this apparent advantage, the flank becomes too small, and too much exposed to the enemy's batteries. This system has been improved by Mallet, and his construction is esteemed the most perfect. It differs little from Vauban's first system. Count Pagan has pointed out the method of building casemates in a manner peculiar to himself.

Vauban has steered between these different methods. He has drawn his flank so that it does not stand too much exposed, nor does its collateral line of defence extend too far from the direct line. He has *effected this by lengthening its flank, and giving it a circular form.*

It cannot be disputed that large and extensive flanks and demigorges are superior to narrow and confined ones. The more capacious the flank the better cal-best which are most capacious, because they afford space in the bastion for the construction of entrenchments.

All parts of a fortification which stand exposed to the immediate attacks of a besieging enemy, must be able to bear the boldest attempts. This is manifest because works are erected round a place for the purpose of preventing an enemy from getting possession of it. It follows that flanked angles are extremely defective when they are too acute, since their points may be easily flanked and destroyed by the besiegers' cannon.

The Dutch construct at sixty degrees: but according to Vauban's method, no work should be under seventy-five degrees, unless circumstances and situation should particularly require it.

The diagram annexed, with the explanation that follows, will convey an idea of M. Vauban's method, in respect to the fortification of towns. See plate (Fluxions).

Inscribe in a circle a polygon of as many sides as the fortification is designed to have fronts; let AB, be one of the sides of half an hexagon, which bisect by the perpendicular CD; divide half of it AC into nine equal parts, and one of these into ten others; then these divisions will be a scale to construct all the parts of the fortification, and each of them is supposed to be a toise or fathom, that is, six French feet; and therefore the whole side AB is supposed to be 180 toises. But it will be more convenient to have a scale of equal parts, by which the works may be constructed.

If in this case, the radius is taken equal to 180 toises, and the circle described with that radius being divided into six equal parts, or the radius being

musket-shot. Wherever
ccessible, either on ac-
pice or marshy ground,
ade larger than those
access.
nountains or rocks should
for their use is generally
inlets into a country,
o provide for a large gar-
circumstances. When
o be placed in the neigh-
sea for the purposes of
the first thing to be con-
tuation, which ought to
bour for shipping. When
near rivers, he always
r side next to the water
n any of the others; for
so liable to be attacked,
were derived from this

axims of fortification are

art of the works be seen
other parts, so that the
lge any where without
the fire of the place.
ould command all pla-
l therefore all the out-
lower than the body of

irthest from the centre
open to those that are

of every part should be
of musket-shot, that is,
homs, so as to be defend-
nce and small arms.
ces should be as direct
t has been found that the
ot to fire directly before
nsidering whether they

quely into the bank.

When wood cannot be obtained for the fascines, the parapet must be clothed with turf, four inches thick, and a foot and a half square

The palisades for fortifying the ditch ought to be nine or ten feet long and six inches thick.

The beams belonging to chevaux-de-frize should be twelve feet long, and six inches broad; the spokes seven feet long, four inches thick, and six inches distant from each other.

Gabions must be three or four feet high, and two or three feet in diameter.

FORTIN, FORTRET, or *field-fort*, a sconce or little fort, whose flanked angles are generally distant one from another 120 fathoms.

FOSS, in fortification, a hollow place, commonly full of water, lying between the scarp and counterscarp, below the rampart; and turning round a fortified place or a post that is to be defended.

FOSS-WAY, one of the four principal high-ways of England, that antiently led through the kingdom; supposed to be made by the Romans, having a ditch upon one side.

FOSSIL, in natural history, denotes in general all things dug out of the earth and are either native or extraneous.

Native fossils, are substances found buried in the earth, or lying on its surface, of a plain simple structure, and shewing no signs of having contained vessels or circulating juices. These are subdivided 1. Into fossils naturally and essentially simple. Of these some are neither inflammable, nor soluble in water; as simple earths, talcs, fibrariæ, gypsum, selenitæ crystals, and spars: others, though uninthe curiosity of several naturalists, who have different systems to account for the appearances of petrified sea-fishes, in places far remote from the sea, and on the tops of mountains; shells in quarries of stone; and of elephants' teeth, and bones of various animals, peculiar to the southern climates, and plants only growing in the east, found fossil in our northern parts.

Some will have these shells, &c. to be real stones, and stone plants, formed after the usual manner of other figured stones; of which opinion was Dr. Lister. Another opinion is, that these fossil shells, with all their foreign bodies found within the earth, as bones, trees, plants, &c. were buried there at the time of the Deluge; and that, having been penetrated by the calcareous or siliceous matter abounding chiefly in watery places, and then in a state of solution they have been preserved entire, and sometimes petrified. Others think, that those shells found on the tops of mountains, could never have been carried thither by the waters of the Deluge; since most of these aquatic animals, on account of the weight of their shells, always remain at the bottom of the water, and never move but close to the ground. They imagine, that a year's continuance of the waters of the Deluge, intermixed with the salt waters of the sea, on the surface of the earth, might occasion the production of shells of various kinds in different climates; and that the saltness of the water was the cause of their resemblance to the sea-shells, as the lakes formed daily by the retention of rain or spring water produce different kinds. Others think, that the waters of the Deluge turned the surface of the earth upside down; as the waters of some rivers overturn their sands, and even the earth itself, in their swellings

performed.

FOUNDERY *in small wo*
in sand. The sand used for
works is of a soft, yellow
my nature; but it being
strew charcoal dust in the
comes black. This sand is rep
ed on a board, with a roller,
being placed over a trough

They then take a board
ledge round it, they fill it
little moistened, to make it
they take wood or metal mo
they intend to cast, and app
mould and press them into
leave the impression. Alon
of the mould is laid half a
linder, for the metal to run
melted into the models,
are placed several others,
to each model placed in the
this frame is finished they
patterns, by loosening the
that the sand may not give w

They then proceed to
half of the mould with the
in another frame, having
entering into holes that corre
the other, make the two cavit
tern fall exactly on each other

The frame thus moulded,
the melter, who, after extend
canal of the counterpart, ad
cross canals to the several m
and strewing mill-dust over
them in an oven.

Both parts of the mould be
are joined by the pins;
their giving way, on account
ed metal passing through the
they are screwed up like a p

While the moulds are
metal is fusing in a crucible

atonic intervals, or two tones

e *Canis.*
VE. See *Digitalis.*
tE, in surgery, a rupture of a
lution of continuity in a bone,
ushed or broken by some ex-

IA, the strawberry; a genus
ynia order, in the icosandria
ts: and in the natural method
er the 35th order, senticosæ.
ree species. 1. The vesca, or
rawberry. The principal va-
1. The sylvestris, or wood
with oval sawed leaves, and
fruit. 2. The Virginian scar-
inia strawberry with oblong
leaves, and a roundish scar-
The moschatta, or hautboy,
awberry, having oval, lanceo-
aves, and large pale red fruit.
ensis, or Chili strawberry, of
Carolina is a variety with large
e flowers, and firm fruit. 5.
or monthly strawberry, having
eaves, flowers, and fruit. All
ties are hardy perennials, du-
t; but the leaves and fruit-
renewed annually in spring.
hrive in any common garden
ing abundant crops annually
h trouble.
onophylla, or simple leaved
produces esculent fruit, and
the former species only in the

terilis, or barren strawberry,
of fruit, though it perfects

I, in anatomy, a term applied
mbranous ligaments of the

inguæ, the ligament under the
ch sometimes ties it down too
bottom of the mouth; and then
e divided, to give this organ
otion.
n fortification, a kind of de-
ing of pointed stakes, six or
ng, driven parallel to the ho-
he retrenchments of a camp,
&c. and to prevent any ap-
alade.
SE, in a general sense, a pri-
emption from ordinary juris-
that for a corporation to hold
; themselves to such a value

EE, in law, signifies the same
ing lands and tenements in

CENSE, in chemistry, a re-
which exudes from the pinus
d the spruce fir.
LEDGE, in our law, signifies
surety for the behaviour of

r FRANC, an antient coin,
ver, current in France. The
gold frank was somewhat more
f the gold crown; the silver
third of the gold one: this
out of use, though *the term is
the name of a money of ac-
equivalent to 20 sols.*
*A, sea heath, or sea-chick-
f the hexandria monogy-*nia class of plants, the flower of which consists of five petals, with a plain limb; the fruit is an oval capsule, containing many ovated seeds. There are three species of this weed.

FRAXINUS, the *ash*, a genus of the diœcia order, in the polygamia class of plants, and in the natural method ranking under the 44th order sepiariæ. There are four species, of which the most useful is the common ash. This tree flourishes best in groves, but grows very well in rich soil in open fields. It bears transplanting and lopping. In Lancashire they lop the tops of these trees to feed the cattle in autumn. The wood is hard and tough, and is much used to make the tools employed in husbandry. The ashes of the wood afford good potash. The bark is used in tanning calf-skin.

FREE-BENCH, signifies that estate in copyhold which the wife, being espoused a virgin, has after the decease of her husband for her dower, according to the custom of the manor.

FREEHOLD, may be in deed or in law. A freehold in deed is actual seisin of lands or tenements in fee-simple, fee-tail, or for life. A freehold in law is a right to such lands or tenements before entry or seizure.

FREESTONE, a whitish stone dug up in many parts of England, that works like alabaster, but is more hard and durable, being of excellent use in building, &c.

FREEZE, or *Frieze*, in commerce, a coarse kind of woollen stuff, or cloth, so called as being freezed or naped on one side.

FREEZING, in philosophy, the same with congelation, or the fixing a fluid body into a firm or solid mass by the action of cold.

This was thought a strong argument in favour of the opinion that cold is a positive substance. But Dr. Black has shewn that in congelation, water instead of being cooled more than it was before, becomes warmer: and that as much heat is discharged, and passes from a latent to a sensible state, as, had it been applied to water in its fluid state, would have heated it to 135 deg. In this process the expansion is occasioned by the production of a number of minute bubbles. Formerly these were supposed to be cold in the abstract; and to be so subtle that, insinuating themselves into the substance of the fluid, they augmented its bulk, at the same time that, by impeding the motion of its particles upon each other, they changed it from a fluid to a solid. But Dr. Black proves that these are only extricated during the congelation; to the extrication of which he ascribes the expansive force exerted by freezing water. The only question now is by what means this air comes to be extricated, and to take up more room than it does in the fluid? To this it may be answered, that perhaps part of the heat, which is discharged from the *freezing water*, combines with the air *in its unelastic* state, and, by restoring its *elasticity*, gives it that extraordinary force *as is seen in the* case of air suddenly ex*tricated in the* explosion of gunpowder.

Cold also usually tends to make bodies

put them into their windows.

Cold, or the absence of heat, is the destroyer of vegetable life, when increased to an excessive degree. It is found that many plants and flowers which seem to be very hardy, go off at a little increase of cold beyond the ordinary standard. And, in severe winters, nature has provided the best defence for the cornfields and gardens, a covering of snow, which preserves such parts green and healthy as are under it, while those which are uncovered are killed or greatly injured.

The term congelation, is applied to water when it freezes to ice; to metals, when they resume their solid form after being melted by heat; or to glass, wax, pitch, tallow, &c, when they harden again after having been rendered fluid by heat. But it differs from crystallization, which is rather a separation of the particles of a solid from a fluid in which it had been dissolved more by the moisture than the action of heat.

The process of congelation is always attended with the emission of heat, as is found by experiments on the freezing of water, wax, spermaceti, &c.; for in such cases it is found that a thermometer dipt into the fluid keeps continually descending as it cools, till it arrives at a certain point, being the point of freezing, which is peculiar to each fluid, where it is rather stationary, and then rises for a little, while the congelation goes on.

Freezing point, denotes the point or degree of cold, shewn by a mercurial thermometer, at which certain fluids begin to freeze, or, when frozen, at which they begin to thaw again. On Fahrenheit's thermometer this point is at + 32 for water, and at —40 for quicksilver, these fluids freezing at those two points respectively.

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s the latter end of the
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with black; the head,
eck, and back, black;
part of the neck, and
orange; lower part of
y white; the quill fea-
yellowish edges; the
; the legs grey. This
nto England at certain
not build here. It is
mong chaffinches, and
s in vast flocks. They
certain times in vast
They are said to be
f beech mast, but will
riousother kinds. This
oughout Europe, and is
e forests of Russia and

a, or sparrow, has the
e wings and tail brown,
d with grey and black,
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e three broods in a year.
ere common about our
y build in every place
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f the brick-work, or in
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gs of a reddish white
th brown. They will
in the neighbouring
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l not unfrequently they
from theirs, to save
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r siskin, has the prime
gs yellow in the middle,
chief tail-feathers with-
ey are yellow at the
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ybird, because it comes
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nds at uncertain times,
, &c. In the bird-shops in
n by the name of the
docile species, and is
ed with the Canary-bird,
ds freely.

linnet, has the bottom
ne blood-red, which
ring advances. These
teemed for their song.
eds of different kinds,
fore they eat; the seed
flax is their favourite
among furze and white
of their nest is made
ts, and lined with wool
lay five whitish eggs,
of the goldfinch.

, or greater red-pole,
nnet, and has a blood-
the forehead, and the
is tinged with a fine
birds are frequent on
re often taken near

lesser red-pole, is about half the size of the last, with a spot of purplish red on the forehead; the breast is of the same colour, but less bright. This species is known about London by the name of stone red-pole. Whole flocks of them, mixed with the siskin, frequent places where alders grow, for the sake of picking the catkins. This species seems to be in plenty throughout Europe, from the extreme parts of Russia to Italy; it is also common in Greenland, and America.

9. The montium, or twite, is about the size of a linnet. It has the feathers of the upper part of the body dusky, those on the head edged with ash-colour, the others with brown; the rump is crimson; the wings and tail dusky, the tips of the greater coverts and secondaries whitish; the legs pale brown. The female wants the red mark on the rump. Twites are taken in the flight-season near London, with other linnets.

10. The amandava, or amaduvade bird, is about the size of a wren. The general colours are brown and red, the tail is black, and the legs are of a pale yellowish white. It inhabits Bengal, Java, and Malacca.

11. The senagala, or Senegal finch, is a species little larger than a wren. The bill is reddish, edged with brown, the upper parts of the body are of a red colour; the lower parts, with the thighs and under tail-covers, of a greenish brown; the hind part of the head, neck, the back, scapulars, and wing-coverts, are brown; the tail black; and the legs pale grey. It inhabits Bengal; and feeds on millet.

12. The canaria, or canary-bird, has a whitish body and bill, with the prime feathers of the wings and tail greenish. It was originally peculiar to those islands to which it owes its name. We are uncertain when it first made its appearance in this quarter of the globe. Belon, who wrote in 1555, is silent in respect to these birds; Gesner is the first who mentions them; and Aldrovandus speaks of them as rarities, observing that they were very dear, on account of the difficulty attending the bringing them from so distant a country. The canary-bird will prove fertile with the siskin and goldfinch; but in this case the produce, for the most part, proves sterile: the pairs succeed best when the hen-bird is the canary, and the cock of the opposite species. It will also prove prolific with the linnet, yellow hammer, chaffinch, and even the house sparrow; but the male canary-bird will not assimilate with the female of these birds; the hen must be ever of the canary species, and the young of these mostly prove male birds.

13. The maja, or cuba finch, is about three and one quarter inches long; it is found in Cuba, and feeds principally on rice.

FRIT, or *Fritt*, in the glass manufacture, is the matter or ingredients of which glass is to be made, when they have been calcined or baked in a furnace.

There are three kinds of frit: the first crystal frit, or that for crystal or clear glass, is made with salt of pulverine and sand. The second frit is made of the ashes of *pulverine or barilla, without extracting the salt from them*. This makes the ordinary white or crystal glass. The third is frit for green glasses, made of common ashes, without any preparation.

black cloths; others on the right side, as coloured and mixed cloths, rateens, bays, freezes, &c. Frizing may be performed two ways: one with the hand, that is, by two workmen, who conduct a kind of plank that serves for a frizing instrument. The other way is by a mill, worked either by water or a horse or sometimes by men. This latter is esteemed the better way of frizing, the motion being uniform and regular, and the little knobs of the frizing are formed more equably and regularly.

FROG. See *Rana*.

FROG-FISH of Surinam, a singular animal, of which there is no specimen in the British or any public museum. In Surinam these fishes are called jakjes. They are cartilaginous, of a substance like our mustela, and exquisite food: they are formed with regular vertebræ, and small bones all over the body divided into equal parts; are first darkish, and then grey; their scales make a beautiful appearance.

FRONTAL MUSCLES. See *Anatomy*.

FRONTIS *Os*, in anatomy, called also os coronale, the bone of the forehead.

FROTH-SPIT, or *Cuckow-spit*, a name given to a white froth or spume, very common in the spring. It forms the nidus of a species of cicada.

FRUSTUM, in mathematics, a part of some solid body separated from the rest.

The frustum of a cone is the part that remains, when the top is cut off by a plane parallel to the base, and is otherwise called a truncated cone.

The frustum of a globe or sphere, is any part of it cut off by a plane, the solid contents of which may be found by this rule. To three times the square of the semidiameter of the base add the square of its height ; then

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ldle than at the edges.
nnatifidus, jagged fucus, or
e, is frequent on sea-rocks
overed by the tides both on
ınd western coasts. It is of a
colour,often tinged with red.
ce is cartilaginous, but tender
rent; the height about two or
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ocamium, or pectinated fucus,
n the sea-rocks. Its natural
ght red or purple,but it is often
with white or yellow. Its sub-
tilaginous, but thin, delicate,
rent; its height commonly
or four inches.
lum, thread fucus, or sea-laces,
the sea-rocks, and waving un-
erlike long strings, frequent on
of the coast. The substance of
ıe and cartilaginous, but not
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d when exposed on the shores
it becomes yellow or white.
iganteus, or gigantic fucus, is
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ound,which in those countries
shed from sand or oose by the
ength of the sea-weeds that
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me of the stalks are 120.
n music, a term derived from
ga, a flight, and signifying a
either vocal or instrumental;
which one part leads off some
uccession of notes called the
ch, after being answered in
eighth by the other parts, is
through the movement, and
maid all the parts at the plea-
omposer, sometimes accom-
her adventitious matter, and
y itself. There are distinct
f fugues; the simple fugue,
gue, and the counter fugue.
, in mechanics, the prop or
hich a lever is maintained.
a genus of plants, of the tri-
ynia class and order. There
, a grass of Surinam.
, or lantern-fly, an insect be-
hemipetera order.
avian lantern-fly, measures
inches and a half from the
il, and about five inches and a
g to wing, when expanded;
vided into several segments;
early equal to the rest of the
round colour is yellow, with
en in some parts,and marked
ed-brown stripes and spots;
e very large, and of a yellow
ntly varied with brown un-
d spots, and the lower pair
d by a large spot on the mid-
the iris or border of the spot
d the centre half red and half
ead or lantern is pale yellow,
dinal red stripes. This beauti-
native of Surinam and many
outh America, and during the
strong a splendour from
ay be employed for the purpose of a candle or torch; and it is said that three or four of the insects tied to the top of a stick, are frequently used by travellers for that purpose.

2. The fulgoria candelaria is a smaller species than the preceding, and is a native of China. It measures nearly two inches in length, and two inches and a half in breadth, with the wings expanded; the body is oval, and the head produced into a long horn-shaped process; the head and horn are of a fine reddish brown or purple, and covered with white specks, the thorax is of a deep yellow, and the body black above, but deep yellow beneath; the wings are oval, the upper pair blackish, with numerous green reticulations, dividing the whole surface into squares, and are farther decorated by yellow bars and spots; the under wings are orange-coloured, with broad black tips.

3. Fulgora diadema is an Indian species, and is distinguished by having a long, spiny front, with a triple division at the tip; its colour is brown, with red and yellow variegations; in size it is nearly similar to that of the preceding species.

FULICA, the *gallinule* and *coot*, a genus of birds of the order of grallæ. There are 25 species, 18 of which belong to the gallinule division, distinguished by having the toes furnished with broad scalloped membranes, and seven comprehend the coots, which have the toes divided to their origin. The following are the most distinguished:

1. The chloropus, or common gallinule, has a bald forehead and broad flat toes. It gets its food on grassy banks, near fresh waters, and builds upon low trees and shrubs, breeding twice or thrice in a summer.

2. The porphyrio, or purple gallinule, is about the size of a domestic fowl. It is more or less common in all the warmer parts of the globe. The female makes her nest among the reeds in the middle of March; lays three or four eggs, and sits from three to four weeks. It will feed on fruit, roots and grain; but will eat fish with avidity.

3. The atra or common coot, has a bald forehead, a black body, and lobated toes, and is about 15 inches in length. They frequent lakes and still rivers; making their nests among the rushes, with grass, reeds, &c. floating on the water, so as to rise and fall with it. They lay five or six eggs, and the young, when just hatched, are very deformed, and the head mixed with a red coarse down In winter the channel near Southampton is sometimes almost covered with them. Their food is small fish and water-insects, but they will sometimes eat the roots of the bulrush and grain.

4. The aterrima, or greater coot, is larger than the last, and its plumage is blacker. This species is said to be found in Lancashire and Scotland, but it is more plentiful on the continent.

FULLER, a workman employed in the woollen manufactories to mill or scour cloths, serges, and other stuffs, in order to render them more thick, compact, and durable.

FULLER'S EARTH, in natural history, a species of clay, of a greyish ash-coloured are much the same with corn-mills: and there are even some which serve indifferently for either use; corn being ground, and cloths fulled, by the motion of the same wheel. Whence in some places particularly in France, the fullers are called millers; as grinding corn and milling stuffs at the same time.

The method of fulling cloths with soap is this: A coloured cloth, of about 45 ells, is to be laid in the usual manner in the trough of a fulling-mill without first soaking it in water, as is commonly practised in many places. To full this trough of cloth, 15 pounds of soap are required, one-half of which is to be melted in two pails of hot water. This solution is poured by little and little upon the cloth, in proportion as it is laid in the trough; and thus it is to be fulled for at least two hours; after which it is taken out and stretched. This done, the cloth is returned into the trough, without any new soap, and there fulled two hours more. Then taking it out, they wring it well, to express the grease and filth. After the second fulling, the remainder of the soap is dissolved as in the former, and cast four times on the cloth, taking out the cloth every two hours to stretch it. When it is sufficiently fulled, and brought to the quality and thickness required, they scour it in hot water, keeping it in the trough till it is quite clean. As white cloths, full more easily, and in less time than coloured ones, a third part of the soap may be spared.

FULMINATION, in chemistry. When three parts of nitre, two parts of potass, and one part of sulphur, all well dried, are mixed together in a warm mortar, the resulting compound is known by the name of *fulminating powder*.

If a little of this is put on an iron spoon,

air to dry. This product i
silver, which cannot even
without producing a violent
Its preparation is so hazard
ought not to be attempted wit
with strong glass eyes, upo
No more than a single grain
time to be tried as an experim

Mr. Chenevix has invented
gerous fulminating silver, wh
prepared: Diffuse a quantity
through water, and let a cur
genated muriatic acid gas pa
Then digest some phosphate
the solution of the oxygena
of alumina, and evaporate it
produce will be a hyper-oxy,
riate of silver, a single gra
in contact with two or three
will explode violently with
friction.

Fulminating mercury. Th
preparations which fulminat
ed with sulphur, and gradu
to a gentle heat, are well kn
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Brugnatelli and Van Mo
wise produced fulminatio
sion, as well by nitrate of
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to Fourcroy and Vauquelin,
concussion with oxymuriate

M. Ameilon had observed,
cipitate obtained from nitrat
by oxalic acid, fuses with a b

But mercury, and most
oxyds, may, by treatment w
and alcohol, be converted i
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inflammable properties of g

when metals, or other hard
corroded or softened, by re-
ain fumes for that purpose.
ne and surgery, fumigation is
tion of fumes to particular
body; as those of l actitious
venereal ulcers.
ON, *animal*, applied to the
he body, is by physicians divi-
tal, animal, and natural. The
ons are those necessary to life,
t which the individual cannot
the motion of the heart, lungs,
atural functions are those which
nnot subsist any considerable
ut, as the digestion of the ali-
its conversion into blood.
nctions include the senses of
asting, &c. memory, judgment,
tary motion.
n anatomy, signifies the bottom
ty in the body: thus, the fund
is that part possessed by the
and retina.
ublic. When the practice was
borrowing money for the state,
e of some tax was generally ap-
as the fund out of which the
and interest of the debt was to be
l. The possession of the ac-
ment given by government for
advanced, establishing a right
the payments from the fund
agreed upon, the sale of these
was considered as a sale of the
n the fund, and as the acknow-
given were of different kinds,
l appellation of the provision
they rested was found more
t for purposes of business:
le and purchase of the govern-
ities was commonly called the
rchase of the public funds, till
he expression has so far varied
original signification, that in-
meaning the revenue out of
lic debts or the interest of them
, it denominates the capital of
, in which sense it is generally

MENTAL NOTE, in music, the
note in a song, or composition,
ll the rest are adapted; it is also
key to the song.
the name of the 4th order of
ss of vegetables, in the Linnæan
omprehending the mushroom
order in Linnæus contains 10 ge-
antients called fungi children of
, to indicate the obscurity of
. The moderns have likewise
s in what rank to place them;
ring them to the animal, some
etable, and thers to the mineral
Messrs. Wilck and Munchau-
not scrupled to rank them in
r of animal productions; be-
n fragments of them or their
macerated in water, they per-
antity of animalcules discharg-
hey supposed capable of being
o the same substance.
hroom is one of the most perish-
ts, and therefore *the most favour-*
generation of insects Consi-
quickness of its growth, it
shed with a power of copious
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th
in zoology, a genus of insects
be o the order of vermes zoophyta. There is only one species, viz. the infernalis, which has a linear smooth body ciliated on each side, with reflexed feelers pressed to its body.

FURLONG, a long measure, equal to one eighth of a mile, or forty poles. It is also used, in some law-books, for the eighth part of an acre.

FURNACE, an utensil to raise and maintain a vehement fire in, whether of coal or wood.

Furnaces are commonly built of bricks, made of sand and clay, or of cast-iron, or of iron plates, which, the better to be defended against the fire, are coated within to the thickness of an inch with Windsor loam.

The burning of the fuel is kept up in the furnace either by a natural current of air, which is caused by the fire itself, and such a furnace is called an air wind furnace; or it is done by compressed air, conveyed to the furnace by a large bellows, as in blast-furnaces.

FURNACE *(glass painters)* is made of brick, nearly square, and about $2\frac{1}{2}$ feet each way. It is cut horizontally in the middle by a grate, which sustains the pan or shovel the glass is baked in. This furnace has two apertures one below the grate to put in the fuel, the other above it, through which the workman sees how the action of the colour goes on.

FURNACES *(hatters,)* are of three kinds: a little one under the mould, whereon they form their hats; a larger in the scouring-room, under a little copper full of lees; and a large one under the great copper, wherein they dye their hats.

FURR, in commerce, signifies the skin of several wild beasts, dressed in alum with the hair on. The kinds most in use are those of the ermine, sable, castor, hare, rabbit, &c.

FURRS, in heraldry, a bearing which represents the skins of certain beasts, used in the doublings of mantles and also in the coat-armour.

FURZE. See Ulex.

FUSANUS, a genus of the polygamia monœcia class and order. There is only one species, a tree of the Cape.

FUSEE, in clock-work, is that part

a field or ordinary, covered with, or divided into fusils.

FUSION, the action of fire, or rather of

FUTTOCKS, in a ship, th
ed over the keel, or those w
breadth.

G

G, the seventh letter of our alphabet; as a numeral it was used by the antients to denote 400: and with a line over it 40,000. In music it is the mark of the treble cliff; and from its being placed at the head, or marking the first sound in Guido's scale, the whole scale took the name of gamut.

GABEL, a word in old records, signifying a tax, rent, custom, or service, paid to the king, or lord.

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GAD-FLY, See *Oestrus*.

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1. Gadus morhua, or common cod. This is an inhabitant of the northern seas, where it resides in immense shoals, performing various migrations at stated sea-

Pennant mentions a sp
weighed 78 lbs. and mea
inches in length, and 5 feet
the shoulders; but the gen
from 14 to 40 pounds.

The cod is of a moderatel
with the abdomen thick an
the head is of moderate siz
large: the jaws of equal len
one bearded at the tip by a
in the jaws and palate are s
teeth: the dorsal and anal
large, the pectoral small,
small and slender: the tai
size and even at the end, t
each side being short, sou
The usual colour of this fish i
the back and sides, and com
with yellow, the belly whi
lours occasionally vary co
lateral line, which is one of
marks of the species, is broa
and the scales are larger tha
the genus.

The food of the cod is smal
testaceous or crustaceous an
crabs, &c. and its digestion
ful as to dissolve the greate
shells it swallows. The f
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ously perforate the living fis

[illegible] near six miles in length, and more [illegible] a mile in breadth. The haddock is [illegible] in vast quantities about Heligoland [illegible] thence sent to Hamburgh. Its food [illegible] of small fishes, worms, and sea-[illegible]. It spawns in the month of Fe-[illegible]

[illegible] Gadus callarias, or dorse, is some-[illegible] smaller than the haddock, rarely ex-[illegible] the weight of two pounds. [illegible] head is marked by several spots, [illegible] in the summer are generally brown [illegible] the winter black: the general co-[illegible] of the fish is cinereous above, and [illegible] beneath, and the scales are small, and [illegible] the upper jaw is longer than the [illegible] and is furnished with more rows of [illegible] at the tip of the lower jaw is a cir-[illegible] beard.

[illegible] dorse is a native of the northern [illegible] as well as of the Mediterranean and [illegible] Baltic. It is taken both by the line [illegible] the net, and is highly estee[illegible] [illegible] food.

[illegible] Gadus barbatus, or whi[illegible] [illegible] exceeds a foot in length, [illegible] from all others by [illegible] one of the size above [illegible] near four inches deep in [illegible]: the back is arched, an[illegible] scales larger than those o[illegible] teeth small, and the head [illegible] the lower jaw are seve[illegible]; the first dorsal fin [illegible] and terminates in a long [illegible] the fins and tail is [illegible], and at the bottom of [illegible] is a black spot: the body [illegible] with yellow: the latera[illegible] is [illegible] broad, and crooked. Thi[illegible] is in [illegible] estimation as a food, and is [illegible]nd in [illegible] Mediterranean and northern [illegible]s.

[illegible] Gadus minutus, or poor, is a small [illegible], seldom exceeding six or seven in-[illegible] length, and of a more slender form [illegible] any of the preceding kinds. It is [illegible] in the Baltic and the Mediter-[illegible]

[illegible] Gadus merlangus, or whiting, with [illegible] dorsal fins, and a beardless mouth [illegible] whiting is the most delicate as well [illegible] most wholesome of the genus, [illegible] does not grow to a large size, the [illegible] length being about ten or twelve [illegible], and the largest scarcely exceeding [illegible]. The body is rather long, and co-[illegible] with small, round silvery scales: [illegible] head and back are of a pale brown, [illegible] sides slightly streaked with yellow. [illegible] fish is an inhabitant of the Baltic, and [illegible] northern seas, and is found in some [illegible] of the Mediterranean. Vast shoals [illegible] in the British seas during the [illegible]; keeping at the distance of from half a mile to that of three from the [illegible] they are caught in vast numbers [illegible] line, their food consists of small [illegible] sea insects and worms: they are [illegible] to be particularly fond of sprats and [illegible]rings, with which the fishermen [illegible] bait for them.

[illegible]s carbonarius, or coal-fish, when [illegible]n, is distinguished by its dark or [illegible]ur, though in *this respect it some-[illegible]les: it is of a moderately long [illegible]nt shape, with a small head, [illegible] snout, and lower jaw exceed-[illegible]ger in length; when full grown* the head, dorsal fins, tail and upper parts of the body a[illegible] of a dusky black, which softens into a [illegible] tinge. It is an inhabitant of the Ba[illegible] northern and Mediterranean sea[illegible]mmon on the most of our rock[illegible]oasts, but particularly on thos[illegible] and the Orkneys.

8. Gadus merluc[illegible], with two dorsal fins. The he[illegible]ge, broad and flat at the top, but c[illegible]d on the sides; the opening of the [illegible] wide, and the jaws armed with tw[illegible] curved teeth, intermixed with sm[illegible]s: the palate is also furnished wi[illegible] of teeth on each side: the pec[illegible] ventral fins are of a moderate s[illegible] the tail is nearly even at the end [illegible]teral line commences by several [illegible]arts beyond the head, and is contin[illegible] a straight direction to the tail: the [illegible]h of the hake is [illegible]

[illegible] of the Mediter-[illegible]n both of which [illegible] it is salted and [illegible]od, haddock, &c. [illegible]e ling, takes its [illegible]ing corrupted [illegible]ody is slender; [illegible] head [illegible]ual size is from [illegible] four [illegible] has been some-[illegible] seven feet: in [illegible]times of an [illegible]ck, and some-[illegible]en is white, as [illegible]he dorsal and [illegible] edg[illegible] white: the tail is ma[illegible] near the end with a transverse black bar, and tipped with white.

The ling is an inhabitant of the northern seas, and forms in many places a considerable article of commerce.

Vast quantities are salted for exportation as well as for home consumption.

11. Gadus lota, or the burbot, highly esteemed for its superior delicacy, is an inhabitant of clear lakes and rivers, and is found in many parts of Europe and Asia. In our country it occurs chiefly in the lakes of the northern counties, but it is said to arrive at its greatest perfection in the Lake of Geneva.

The burbot is a very voracious fish, preying on all the smaller fishes, as well as on frogs, worms, and aquatic insects: the largest of those which are taken in England have been rarely known to exceed the weight of three pounds, but in some parts of Europe they are found of more than double that weight, and of the length of three feet or more.

GÆRTNERE, a genus of plants of the decandria monogynia class and order. There is one species which is a shrub of the East Indies.

GAGE, in law-books, the same with surety or pledge.

GAGE, in the sea-language. When one ship is to windward of another, she is said to have the weather-gage of her. They likewise call the number of feet that a vessel sinks in the water the ship's gage: *this they find by driving a nail into a pike near the end, and putting it down beside the rudder* till the nail catches hold under it; then as many feet as the pike is under water, is the ship's gage.

GAGE, among letter-founders, a piec-

FUSION, the action of fire, or rather of

breadth.

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is also furnished with a row of teeth on each side: the pectoral and ventral fins are of a moderate size, and the tail is nearly even at the end; the lateral line commences by several small warts beyond the head, and is continued in a straight direction to the tail: the length of the hake is from one to three feet.

This fish is an inhabitant of the Mediterranean and northern seas, in both of which its fishery is considerable: it is salted and dried in the manner of cod, haddock, &c.

9. Gadus molva, or the ling, takes its name from its length, being corrupted from the word long: the body is slender; and the head flat. The usual size is from three to four feet, but it has been sometimes seen of the length of seven feet: in colour it varies, being sometimes of an olive hue on the sides and back, and sometimes cinereous: the abdomen is white, as are also the ventral fins, the dorsal and anal are edged with white: the tail is marked near the end with a transverse black bar, and tipped with white.

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When the bucket is drawn up, the mercurial thermometer, fixed in it, is examined; but great care must be taken to observe the degree at which the mercury stands, before the lower part of the thermometer is taken out of the water in the bucket, else it would be altered by the different temperature of the air.

To keep the bucket in a right position. there are four cords fixed to it, reaching about four feet below it, to which the sinking weight is fixed.

Wind-Gage, an instrument for measuring the velocity of the wind.

GAHNIA, a genus of the monogynia order, in the hexandria class of plants. There are two species, herbs of New Zealand and Otaheite.

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la, and Britain. It occurs in
inated and cellular: but
ntly chrystalized in six-sided
h are generally truncated and
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THECUS. *Colugo.* A ge-
upeds. The generic charac-
teeth in the upper jaw none;
six, short, broad, distant,
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al, sharp, serrated; grinders
ed, and muricated with coni-
ences; flying-skin surround-
limbs, and tail.

cus volans, the flying colu-
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at in a gentle manner; but
it uses a leaping pace. The
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eadth, when expanded, near-
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which it is enabled to fly, is
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of the animal is generally of a
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the size of a cat, and is cover-
th a soft, grey fur, like that
that the head is oblong, the
d round, and that it has five
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he parent by their mouth and
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a genus of the monogynia or-
andria class of plants, and in
thod ranking under the 47th
There are 39 species, of which the most remarkable are, the verum or yellow lady's bed-straw, and the aperine, clivers or goose-grass. The former has an erect, square, stem; the leaves generally eight in each whorl, linear, pointed, brittle, and often reflex; branches short, generally two from each joint, terminating in spikes of small yellow flowers. It grows commonly in dry ground and on road-sides. The flowers will coagulate boiling milk; and the best Cheshire cheese is said to be prepared with them. The French prescribe them in hysteric and epileptic cases. Boiled in alum-water, they tinge wool yellow. The roots dye a red not inferior to madder. The aperine or clivers has a square, rough, jointed, weak stem, two, three, or four feet long, and adhesive, the branches are opposite; the joints hairy at the base. The expressed juice of this plant taken internally, and the bruised leaves applied by way of poultice, are said to have been used with success as a cure for the cancer.

GALL, in the animal œconomy, the same with bile.

GALL-BLADDER, called vesicula, and cystis fellea, is usually of the shape of a pear, and of the size of a small hen's egg. It is situated in the concave side of the liver, and lies upon the colon, part of which it tinges with its own colour. It is composed of four membranes, or coats: the common, the vesicular, the muscular and the nervous one, which last is of a wrinkled or reticulated surface within, and furnished with an unctuous liquor.

The use of the gall bladder is to collect the bile, secreted in the liver, and mixing with its own peculiar produce, to perfect it farther, to retain it a certain time and then to expel it.

GALL, in natural history, denotes any protuberance or tumour produced by the puncture of insects on plants and trees of different kinds. Galls are of various forms and sizes, and no less different with regard to their internal structure. Some have only one cavity, and others a number of small cells communicating with each other. Some are as hard as the wood of the tree they grew on, whilst others are soft and spongy; the first being termed gall-nuts; and the latter berry-galls, or apple-galls.

Oak-galls, put into a solution of vitriol in water, give it a purple colour; which, as it grows stronger, becomes black, and on this property depends the art of making our writing-ink, and dyes.

GALLATS, in chemistry: whether gallic acid is capable of forming crystallizable salts with the different bases, is still uncertain.

1. When the alkalies are dropt into a solution of gallic acid in water, or into a solution containing gallic acid, it becomes green. This change is considered by Proust as a decisive test of the presence of gallic acid. The same change of colour takes place when gallic acid is poured *into barytes water*, strontian or lime water, *and at the same time* a greenish brown *powder precipitates.* The green liquid *which remains* contains only gallic acid *combined* with the earth. But if we attempt *to evaporate it to* dryness, the green co-

trived by Dr. Hales, to find the different degrees of coolness and saltness of the sea, at different depths: consisting of a common bucket, with two heads, in each of which is a round hole near four inches diameter, and covered with valves opening upwards; and that they might both open and shut together, there is an iron-rod fixed to the upper part of the lower valve, and at the other end to the under part of the upper valve; so that as the bucket descends both the valves open by the force of the water; which has a full passage through the bucket, but when this is drawn up then both the valves shut by the force of the water at the upper part of the bucket, so that it is brought up full of the lowest sea-water to which it has descended.

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in a single stream. It is
vast number of stars, too
mote from the earth, to be
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all parts of it, in great
telescope.

GALBANUM, a gum
stem of an umbelliferous
in Persia and many parts of

It is sometimes met with
loose granules, called drops
sometimes in large masses,
ny of these blended together
is soft like wax, and, when
white; but it afterwards
lowish; it is of a strong
taste; it is inflammable in
a resin, and soluble in water
It is of service in asthmas
coughs: also hysteric
dissipates flatulencies.

GALEGA, a genus of plan
and order diadelphia decan
19 species; some of them
name of goats' rue.

GALENIA, a genus of
gynia order, and octandria
and in the natural method
the 13th order, succulent
two species, shrubs of the

GALENIC, or *Galenical*,
a manner of treating diseases
the principles of Galen is
the chemical practitioners.

GALENA, in mineralogy,
of lead, which is found both
crystallized. The primitive
crystals is a cube.

Its colour is commonly
like lead, but brighter.
Texture foliated. Frag
Soft; but brittle. Specific
7.587. Effervesces with

volans, the flying cat-
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Oak-gall, put into a solution of vitriol

3. When a small portion of alum is mixed with the infusion of nut galls, it separates the whole of the tan and extract, and leaves the liquid limpid and of a pale yellowish green colour. This liquid, by spontaneous evaporation, yields small transparent prismatic crystals, which, according to Mr. Davy, are supergallats of alumina. They afford the only instance of a gallat capable of existing in the state of crystals. The quantity of alumina is too small to disguise the properties of the acid

GALLEON, in naval affairs, a sort of ships employed by Spain in the commerce of the West Indies. The Spaniards send annually two fleets; the one for Mexico which they call the flota; and the other for Peru, which they call the galleons.

GALLERY, in fortification, a covered walk, across the ditch of a town, made of strong beams, covered over head with planks, and loaded with earth.

GALLERY *of a mine*, is a narrow passage, or branch of a mine carried on under-ground to a work designed to be blown up.

GALLIAMBIC VERSE, in antient poetry, a verse consisting of six feet.

GALLIC acid, in chemistry, is obtained from the nut-gall which grows on the oak, In an infusion of galls made with cold water, a sediment is formed which has a crystalline form and an acid taste. By an infusion of galls exposed to the air and removing now and then the mouldy skin formed on its surface, a large quantity of this sediment was obtained; which being edulcorated with cold water, redissolved in hot water, filtrated and evaporated very slowly, yielding an acid salt in crystals as fine as sand.

Mr. Davy has pointed out another me-

of lace, used to edge or border

GALOPINA, a genus of
tetandria digynia class and
none; cor. four-cleft: seeds
A plant of the Cape.

GALVANISM, a term use
the influence of metals by
contact with the animal bod
year 1794, was published a
mal electricity by Dr. Galva

His discoveries were made
with dead frogs. He first di
a dead frog, skinned, is capa
its muscles brought into act
of electricity.

Secondly, that independen
parent electricity, the same
be produced in the dead an
in a detached limb, by conne
tween the nerves and muscle
trical conductors. Similar
were also instituted upon ot
and as the power seemed to
in the animal parts, it was
animal electricity. We shal
describe the several facts w
this sort of muscular motio
proceed to those which refe
of the contact or action of on
substance upon another, an
the metallic are the most con

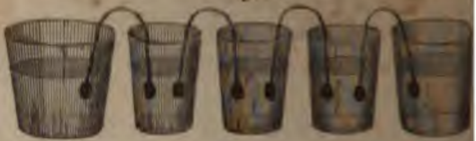
The action of electricity on
as well as other animals ex
mulous motion of the musc
rally an extension of the limb

Galvani used to skin the
recently dead, and leave th
to a small part of the spine, l
from the rest of the body.
limb may be prepared in a
ner.

If the limbs thus prepared
so that a little electricity may

GALVANISM.

Fig. 1.



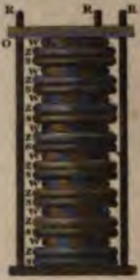


Fig. 2.

Fig. 3.

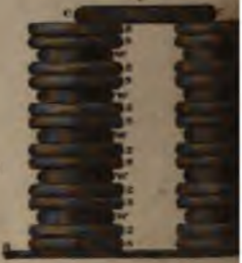


Fig. 4.

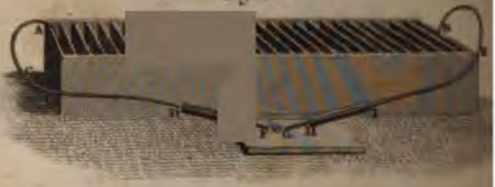
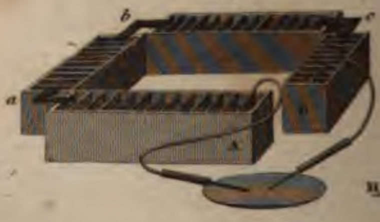


Fig. 5.



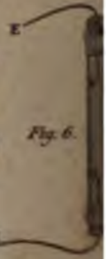


Fig. 6.

Published Jany. 1, 1810, by R. Phillips, Bridge Street, Blackfriars,

etals, water, a num-
en wood. But the
iis circuit, must be
rfect contact with
lone by pressure, or
of water, &c. The
s will answer only
pared animal is vi-
he power begins to
rfect conductors on-
ven these will pro-

oducing those move-
imal parts is by the
etals, of which silver
ough silver and tin,
and other combina-
nferior. If part of the
m a prepared limb
tin foil, or laid upon
silver laid with one
muscle, and with the
zinc, the motion of the
gorous. The two me-
not in contact with the
any other part of the
y be completed by
luctors, as water, &c.
y, when undergoing
erations, and its am-
s been convulsed by
etals. But the living
ecome sensible of the
pplication in an harm-
he senses of taste and
ed by it, but in differ-
ng to the constitutions

iece of zinc upon his
some other metal, as
ngue; on forming the
tween those two me-

of zinc between the upper lip and the gums, as high as possible, and a silver piece of money on the tongue; or by putting a piece of silver high up in one of the nostrils, and a piece of zinc in contact with the upper part of the tongue; for in either case the flash of light will appear whenever the two metals are made to communicate, either by the immediate contact of their edges, or by the interposition of other good conductors.

When the eyes are in a state of inflammation, the appearance of light is much stronger.

When the science was advanced no farther than the knowledge of the above facts, it was doubtful whether the convulsions of prepared animal limbs, and the sensations produced by metallic substances, were owing to some electrical property peculiar to the animal parts, which might be conducted through the metals from one part to the other; or to a quantity of electricity, which might be supplied by the metals themselves. The latter supposition however was soon verified by the result of experiments, which prove that electricity is produced by the contact, not only of metallic substances, but of other bodies.

It had been long asserted, that when porter is drunk out of a pewter pot, it has a taste different from what it has when drunk out of glass or earthen ware.

It has been observed, that pure mercury retains its metallic splendor during a long time; but its amalgam with any other metal is soon tarnished or oxidated.

It was also known that a piece of zinc might be kept in water for a considerable time, with hardly oxidating at all; but that the oxidation would soon take least active:

" 1. Pure water; 2. Water mixed with clay or chalk; 3. A solution of sugar; 4. Alcohol; 5. Milk; 6. Mucilaginous fluids: 7. Animal gelatinous fluids; 8. Wine; 9. Vinegar and other vegetable juices and acids; 10. Saliva; 18. Mucus from the nose; 12. Blood; 13. Brains; 14. Solution of salt; 15. Soap suds; 16. Chalk-water; 17. Concentrated mineral acids; 18. Strong alkaline leys; 19. Alkaline fluids; 20. Livers of sulphur."

2. The simplest combinations capable of producing galvanic effects, (viz. to convulse the prepared limbs of a frog, or to excite the taste upon the tongue, &c) must consist of three different conductors: viz. of one conductor of one class, and two different conductors of the other class.

When two or three bodies are of the first class, and one is of the second, the combination is said to be of the first order; otherwise it is said to be of the second order.

In a single active galvanic combination, or, as it is commonly called, in a simple galvanic circle, the two bodies of one class must touch each other in one or more points, at the same time that they are connected together at other points by the body of the other class. Thus, when a prepared frog is convulsed by the contact of the same piece of metal in two different places; then the fluids of those parts, are the two conductors of the second class; and the metal is the third body, or the conductor of the first class. If two metals are used, then the fluids of the prepared animal may be considered as one body of the second class. Thus also, when a person drinks out of a pewter mug; the saliva or moisture of his under lip is one fluid or one conductor of the

ver, or lead, with a
line sulphuret, and diluted
forms a very active galvanic

The following lists contain
arrangement of the best
disposed in the order of their
commencing with the most
Table of galvanic circles of
viz. which consist of two
the first class, and one of the

Zinc, with gold, charcoal,
tin, iron, or mercury; and
ing a small quantity of any
acids.

Iron, with gold, charcoal,
per or tin, and a weak
the mineral acids.

Tin, with gold, silver, or
a weak solution of any
acids.

Lead with gold, or silver
acid solution.

Any of the above
common water, viz. water
mospheric air, or especially
taining oxygen air.

Copper, with gold, or
lution of nitrate of silver
or the nitric acid; or the

Silver, with gold, and the

Table of galvanic circles
order.

Charcoal, Copper, Silver, Lead, Tin, Iron, or Zinc,	with water, or with a solution of any hydrogenated alkaline sulphurets, capable of acting on the first three metals only;

The action of a simple
is dependant on the quanti

combinations are dis-
ounteract each other.
re said to be of the first
ccording to the simple
ich they consist. Thus
laid upon a piece of
ece of moistened card
en a similar arrange-
es laid upon them, and
t upon this, &c. all in
he whole will form a
order. But if the ar-
by connecting a piece
iece of cloth moistened
atter with a piece of
th a solution of sulphu-
his with another piece
whole will form a bat-
order.

uishes the batteries of
ito these classes.

le is composed, when-
ic plates, or arcs, are
two of their surfaces
h different fluids, one
ther incapable of oxi-
and regular series of
are formed.

e combinations or ele-
consist each of a sin-
a metallic substance
n sulphurated hydro-
issolved in water, with
rets of potass on one
n the other.

erful class is formed
bstances oxidable in
of acting on solutions
nnected, as plates, with
d solutions of sulphu-
the opposite sides of
undergoing different
the mode of alterna-

hat the parts of a bat-
eract each other, will
d by considering that
interrupted galvanic
positive and a nega-
every complete gal-
ectric fluid circulates

vation holds good with
ction of any number
z. that they must not
other, or if a certain
ounteract each other,
only form the active

e general laws, with
ic combinations, we
cribe the practical con-
effects of those combi-
of the compound ar-
e ies.

single galvanic circles
othing more need be
to their construction;
bodies are selected,
only take care that
fect.

es have been construct-
s. But the most usual
nted by figs. 1, 2, 4.
ore easily constructed;
ver, is the most com-

1. *consists of several*

glasses, or cups, full of water, or of water and salt, &c.; and two plates unconnected with each other, viz. a plate of zinc and a plate of silver, are plunged in the fluid of each cup, excepting the first and last; but each of those plates must have a sort of tail by which they are so connnected that the silver plate of one cup communicates with the zinc plate of the next, and so on.

The battery, fig. 2. consists of pieces of silver, about as big as half-crowns, pieces of zinc of an equal size to those of silver, and pieces of card, or cloth, or leather, or other bibulous substance, a little smaller in diameter than the metallic pieces, and soaked in water or in other proper fluid.

Those pieces are disposed in the order of silver, zinc, and wet cloth, &c. The pieces of card, or cloth, &c. must be well soaked in the fluid; but before they are applied, they should be squeezed that the superfluous fluid may not run down the outside of the pile or insinuate itself between the pieces of silver and zinc.

The three rods R, R, R, are of glass or baked wood; and the piece of wood, O, slides freely up or down the rods. This serves to prevent the falling of the pieces.

When the battery is to be very powerful, or to consist of numerous pieces, the best way is to form two or three or more piles, and to join them by pieces of metal, as *c c* in fig. 3. where two piles are joined together, so that *a* is the negative extremity, and *b* is the positive extremity of the arrangement, or of the two piles considered as one.

The battery, fig. 4, consists of an oblong vessel of baked wood, about three inches deep and as much broad. In the sides of this vessel grooves are made opposite to each other, and about one-eighth of an inch in depth. In each pair of grooves a double metallic plate, viz. a plate of zinc and a plate of silver soldered together at their edges, are cemented; by which means the wooden vessel is divided into several partitions. The cementation of the metallic pieces into the sides and the bottom of the vessel, must be so accurate as not to permit the passage of any fluid from one cell into the next.

Those cells are afterwards filled almost to the top with water, or any other fluid, according to the foregoing table; and thus the whole will form a battery, consisting of various repetitions of silver, zinc, and fluid. Two or more of such batteries may be joined, as has been said of the preceding battery, (See fig. 5.)

The action of these batteries is greatest when they are first filled with the fluid; and it declines in proportion as the metal is oxidated, or the fluid loses its power. Hence, after a certain time, not only the fluid must be changed, but the metallic pieces must be cleaned by removing the oxidated surface; which is done either by filing or by rubbing them with sand or by immersing them in diluted muriatic acid, and then wiping them with a coarse cloth. The metallic pieces of the battery, fig. 3, may be cleaned by the last method, and wiped by introducing a stick with a rag into the cells.

Thus much may be sufficient with respect to the construction of simple and compound galvanic arrangements. It is

(4) That action increases, or otherwise modifies, the chemical agency of the bodies concerned, on each other.

The limbs of animals, especially of frogs recently dead, are the most sensible instruments of galvanic powers; and, in fact, the simplest galvanic circles will affect them, when they will not produce any other decisive electrical effect.

The various powers of different simple circles may be ascertained by applying them to such animal preparations as have their vitality or irritability more or less exhausted. Thus Volta says, " If you take a frog, the head of which has been cut off, and which has been deprived of life by thrusting a needle into the spinal marrow, and immerse it without skinning, taking out the bowels, or any other preparation, into two glasses of water, the rump into one, and the legs into the other as usual; it will be strongly agitated and violently convulsed when you connect the water in both glasses by a bow formed of different metals, as silver and lead,' or silver and zinc; but this will not be the case when the two metals differ less in regard to their powers, such as gold and silver, silver and copper, copper and iron, tin and lead. But the effect will be fully produced on the frog, if you immerse in one of the glasses the end of a bow of tin or zinc, and into the other glass the other end of this bow when rubbed over with a little alkali. The experiment may be performed still better with an iron bow, one end of which has been covered with a thin coating of nitrous acid; and beyond all expectation, when you take a silver bow, having a little sulphuret of potass adhering to its extremity.

Mr. Davy observes, that if zinc and silver are made to form a circle with distilled water, holding in solution air, for

The battery not only co
pared limbs of a frog, or produc
pearance of a flash of light be
man eye; but it shews all the p
of electricity. It gives the
fects the electrometer; shews
spark, accompanied with an
port; it burns metallic and
bustible bodies; and continue
for a long time.

When the galvanic battery
order consists of 20 repetition
combinations, if you touch wi
one extremity of the battery,
your other hand to the othe
you will feel a slight shock,
which is communicated by a L
weakly charged, and it will be
beyond the fingers, or at most
This shock is felt as often as yo
contact. If you continue th
contact with the extremities,
ceive a slight but continued
and when the part which to
tremity of the battery is ex
wounded, this sensation is pai

The dry skin of the human
dom capable of conducting
therefore the fingers should b
with water. It will be better
a wire that proceeds from o
of the battery, in a bason of w
in you may plunge one of
then grasping with your othe
moistened a large piece of m
stance a silver spoon, touch t
of the battery with it, and th
be felt more distinctly. By
the shock has been felt when
consisted of less than 20 repe

Instead of one person, sev
may join hands (which m
moistened with water), and
ing the circuit, they will all f

latter will become
antaneously, charg-
er as if it had been
urns of a common
ad with that charge
k, or affect an elec-

galvanic battery,
n inflammable bo-
nmon air, sets them
unpowder, hydro-
ith other combusti-
ery slender metallic
ves. The mode of
the battery for such
fig. 6, where A B
l galvanic battery;
communicates with
attery at A; BG is
ommunicates with
, HI, are two glass
those wires pass.
nove the wires by;
shock. If the two
brought sufficiently
spark will be seen
between those ex-
ustible substances,
placed, to be fired.
00 pairs of metallic
nd zinc, each five
23 inches of fine
re about $\frac{1}{375}$ inch
ted into a figure glo-
representation of a
he same kind, fast-
n cramps *a*, *b*, *c*.
receiver of the air-
attery acts less pow-
n air; but in oxy-
eased power.
man body, forming
galvanic battery, is
situation, the irri-
more or less dis-
painful, according
e parts concerned.
ely to prove useful
s disorders, and is
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s.
ary phenomena of
the chemical effects
oduced by it upon
, or upon such as
t. We shall here
mode of exhibiting
e phenomena, the
water.
a glass tube full of
ving a cork at each
copper wire, which
emity of a galvanic
hrough the cork A,
ube. HG is a simi-
eds from the other
y, and comes with
in the distance of
om the wire F.
ll find that bubbles
nstant stream from
ire which proceeds
nd of the battery;
ding to the upper
umulate. This gas
may be inflamed
other wire F depo-

sits a stream of oxide in the form of a cloud, which accumulates in a greenish form in the water, or on the sides of the tube, and is a perfect oxide of the brass. The wire F is discoloured and corroded. If you interrupt the circuit, the production of gas and of oxide ceases immediately. Complete the circuit, and the production of gas re-appears.

This production of gas may be observed even where the battery consists of not more than six or eight repetitions of silver, zinc, and water. In short, if the power of the battery is sufficient to oxidate one of the wires of communication, the other wire will afford hydrogen gas; both extremities of the wires being in water.

It seems from hence that the hydrogen is separated from the water, and is converted into a gaseous state by the wire connected with the negative extremity of the battery; whilst the oxygen unites with and oxidates the wire connected with the positive end of the battery. If you connect the positive end of the battery with the lower wire of the tube, and the negative with the upper, the hydrogen proceeds from the upper wire, and the lower wire is oxidated.

If two wires of gold or platinum are used, then the stream of gas issues from each, the water is diminished, and the collected gas is found to be a mixture of hydrogen and oxygen. It explodes violently.

Those two different elastic fluids may be obtained separate from each other by the following means: Let the extremities of the two wires which proceed from the battery, be immersed in water, at the distance of about an inch from each other, and place over each of them a small glass vessel inverted and full of water.

In the above apparatus, a little hole must be made in the lower cork B, for the purpose of giving exit to the water in proportion as the gas is formed.

Little is yet known concerning the chemical changes taking place in the batteries of the second order. But from several experiments it seems they are different in the laws of their production from those of the first order.

Thus, when single metallic wires with water are placed as series in powerful batteries of the second order, the influence producing oxygen seems to be transmitted by the point in the place of that part of the plate which was apparently incapable of undergoing oxidation; whilst the hydrogen is evolved from that point where the oxidating part of the primary series appeared to exist.

The agency of the galvanic influence, which occasions chemical changes and communicates electrical charges, is probably in some measure distinct from that agency which produces sparks and the combustion of bodies.

The one appears to have little relation to surface in compound circles, but to be great in some unknown proportion, as the number of series are numerous. The intensity of the other seems to be as much connected with the extension of the surfaces of the series as with their number.

Thus, though eight series composed of

The above facts can hardly leave any doubt with respect to the identity of the galvanic power and the electricity produced by means of a common machine, or that which is brought from the clouds; but, what is more remarkable, it reconciles to the same principle the animal electricity, viz. the power of the torpedo, &c. since all the phenomena of the animal electricity agree with those of the galvanic battery.

But the most striking circumstance is, that the electric organ of any of the above-mentioned fishes seems to be constructed exactly like a galvanic battery; for it consists of little laminæ or pellicles arranged in columns, and separated by moisture. It seems, in short, to be a galvanic battery, consisting of conductors of the second order only, but undoubtedly of different conducting powers.

Though the galvanic battery exhibits all the leading properties of common electricity, such as the attraction, the spark, &c. yet in some effects, viz. the decomposition of water, oxygenation of metals, &c. the former seemed to differ considerably from the latter; but those apparent differences have been reconciled by some very ingenious experiments and observations of Dr. Wollaston, who succeeded in decomposing water by means of a current from the common electrical machine.

Another most important discovery is the decomposition of alkalies, by professor Davy. On bringing potash and soda within the action of a powerful voltaic battery, metalline substances were produced, which he has named *potassium* and *sodaium*.

GAMBOGE, a concreted vegetable juice, of a gummy resinous nature, and beautiful yellow, chiefly brought from Cambaja, in the East Indies. It is a strong

Hence those animals feræ na
come under the denominati
are styled his majesty's ga
which he has he may grant to
consequence of which anothe
scribe to have the same, w
precinct or lordship. Henc
the right of lords of manors
the game within their respe
ties.

As the sole right of taking
ing game belongs to the kin
may authorize the only pers
acquire any property in
coming under that denomina

For the preservation of th
animals: and to prevent p
ferior rank from misemploy
various acts of parliament
made, by which the commo
not injured, since they are
no right which they ever enj

GAMELION, in antient
was the eighth month of
year, containing 29 days, a
to the latter part of our Jan
ginning of February.

GAMING, *laws of*. Thes
on the doctrine of chances.

De Moivre, in his treatise
Sortis, has computed the
ces in several cases that occ
the laws of which may be
what follows.

Suppose p the number of
an event may happen, and
of cases wherein it may no
sides have the degree of pro
is to each other as p to q.

If two gamesters, A and
this footing, that if the case
shall win; but if q happen,
and the stake be a; the ch

ance of A will be to that of
10156525, or nearly as 2 to 3.
re engaged at quoits, and
some time, A wants 4 and
so much the better gamester,
ice against A upon a single
be as 3 to 2; what is the
chances? Since A wants 4,
game will be ended at nine
efore, raise $a + b$ to the ninth
it will be $a^9 + 9a^8b +$
$^6 b^3 + 126a^5 b^4 + 126a^4 b^5$,
$36aab^7 + 6ab^3 + b^9$; call
nd you will have the ratio of
numbers, viz. 1759077 to

ay at quoits, and A can give
t is the ratio of their chances
row? Suppose the chances as
se $z + 1$ to its cube, which
$3z^2 + 3z + 1$. Now, since A
2 out of 3, A might undertake
throws running; and, conse-
chances in this case will be
$^2 + 3z + 1$. Hence $z^3 =$
1; or, $2z^3 = z^3 + 3z^2 + 3z$
herefore, $z\sqrt[3]{2} = z + 1$; and
, $z = \frac{1}{\sqrt[3]{2} - 1}$. The chan-
, are $\frac{1}{\sqrt[3]{2} - 1}$, and 1, respec-

have two wagers depending,
which I have 3 to 2 the best
d in the second 7 to 4, what is
ty I win both.
ability of winning the first
he number of chances I have
ed by the number of chances:
y of winning the second is $\frac{7}{11}$,
ltiplying these two fractions
product will be $\frac{21}{55}$, which
ility of winning both. Now,
being subtracted from 1, the
$\frac{34}{55}$, which is the probability
both wagers: therefore the
me are 34 to 21.
ld know what the probability
g the first, and losing the
ue thus: the probability of
first is $\frac{3}{5}$, the probability of
ond is $\frac{4}{11}$; therefore multi-
$\frac{4}{11}$ the product $\frac{12}{55}$ will be
ity of my winning the first
e second; which being sub-
1, there will remain $\frac{43}{55}$,
probability that I do not win
d at the same time lose the

ld know what the probability
the second, and at the same
time losing the first, I say thus: the probability of winning the second is $\frac{7}{11}$; the probability of losing the first is $\frac{2}{5}$; therefore multiplying these two fractions together, the product $\frac{14}{55}$ is the probability I win the second and also lose the first.

4. If I would know what the probability is of losing both wagers, I say, the probability of losing the first is $\frac{2}{5}$, and the probability of losing the second $\frac{4}{11}$; therefore, the probability of losing them both is $\frac{8}{55}$; which being subtracted from 1, there remains $\frac{47}{55}$: therefore the odds of losing both wagers is 47 to 8.

This way of reasoning is applicable to the happening or failing of any events that may fall under consideration.

GAMMONING, in sea language, denotes several turns of rope taken round the bow-sprit, and reeved through holes in knees of the head, to secure the bowsprit.

GAMMUT, in music, the name given to the scale laid down by Guido, and to the notes of which he applied the monosyllables *ut*, *re*, *mi*, *fa*, *sol*, *la*. Having added a note below the lowest tone of the antients, he adopted for its sign, the gamma, or third letter of the Greek alphabet; and hence his scale was afterwards called gammut. This gammut consisted of twenty notes, viz. two octaves and a major-sixth. The first octave was distinguished by capital letters, as G, A, B, &c. the second by small letters, *g*, *a*, *b*, &c. and the supernumerary by double letters, as *gg*, *aa*, *bb*, &c. By the word gammut, we now generally understand the whole existing scale; and to learn the names and situations of its different notes is to learn the gammut.

GANG, or **GANGUE**, in mineralogy, is a word used by German mineralogists to denote a metallic vein. But according to the French it denotes the stony matter which accompanies the ore in the vein.

GANG-WAY, is the several passages or ways from one part of the ship to the other; and whatever is laid in any of those passages is said to lie in the gangway.

GANGLION, in anatomy, is a knot found in the course of the nerves. In surgery it is a hard tubercle in the carpus but without any pain.

GANGRENE, is a great and dangerous degree of inflammation wherein the parts begin to be in a state of mortification.

GARBE, in heraldry, a sheaf of grain, said to represent summer, as a bunch of grapes does autumn.

GARBOARD-STRAKE, the plank next the keel of a ship.

GARCINIA, a genus of the monogynia order, in the dodecandria class of plants, and in the natural method ranking under the 18th order, bicornes. There are three species. The principal of which, is an elegant tree called mangostana.

This tree has been accurately described by Dr. Garcin, in honour of whom, Lin-colour, and its juice is purple. The inside of this fruit is a furrowed globe, divided into segments, which are white, transparent, fleshy, membranous, full of juice of a taste of strawberries and grapes together.

This tree grows in the Molucca islands, where it is called mangostan, but it has been transplanted to Java and Malacca.

GARDENIA, a genus of plants of the pentandria monogynia class and order. There are 15 species, chiefly shrubs of the Cape and Japan. They are known in our stoves, by the name of Cape jasmin, and some of them are highly ornamental.

GARDENING. This art, so natural to man, may properly be divided into two branches; practical, and picturesque.

A garden, properly speaking, is a small spot of ground attached to the house. As the house is itself a regular and formal object, so we naturally expect something of the same regularity in this appendage. Neatness too is one of the chief excellences of a garden, and this is found to be wholly inconsistent with a rage for the picturesque.

The situation of a garden should be dry, but rather low than high, and as sheltered as can be from the north and east winds. These points of the compass should be guarded against by a wall ten feet high; lower walls do not answer so well for fruit-trees. A garden should be so situated, to be as much warmer as possible than the general temper of the air is without, or ought to be made warmer by the ring and subdivision fences.

The form of a garden may be a square but an oblong is preferred, and the area rather a level; or if there is a slope it should be southward, a point either to the east or west not much signifying; but not to the north, if it can be avoided, because crops come in late, and plants do not stand quire as much room as the apricot r more; as they grow freely, and xtend without shortening. Though ees are best planted in October, hould not be till March.

ntermediate spaces between peach- arines, and apricots, may have a dwarf cherry, or currant or goos- ee of the early sorts, as the smooth nd small red, to come in early. erever grapes can be expected to there let a young plant, or cutting, though the space should be confi- r the vine, freely as it shoots, e knife well to keep it within . If the wall is high, the cherry or ay be half-standards; which be- r a while kept above, will be more the way of the principal trees; dwarfs may be trained so as not ere. Some have planted half-stan- f the same kind of fruit as the but whichever mode is adopted, ntermediate trees be pruned away n good time, in order to accommo- principals freely as they mount cend.

s, cherries, and pears, may occu- other walls; the two former at fteen feet, or it may be twenty under. Cherries, except the mo- will not do well in a full north as- but any sort of plum (rather a late d summer pears, and also nut-trees you chuse to train them. There always be some currants and goose- in an east and north situation, at tance of eight feet, where they will ly matted, when ripe, to come in s October, November, or perhaps ber. Pear-trees of free growth are to be kept within tolerable compass walls; but if attempted, should least thirty feet allowed them. t sorts of winter pears deserve a ny wall to ripen them well, and ve them in size and flavour. The nd of a house is well adapted for tree, as it affords room, which quire. Apples may do on a wall any on a good wall, let it be the pippin), yet the practice is seldom d. For furnishing walls chuse trees derate wood, young, well rooted, and healthy.

n the planting of a garden is finish- will be a good way to have a plan aken, with the name of every pe- tree marked on it in their place, to ured of the sorts when they come to

it may be observed, that if any reen hedges are desired in or the garden, yew, box, alaternus, us, phillyrea, and pycarantha, may pt low, and clipped in form, if so d; in addition to which, if a few were intermixed, it would have a pretty effect. A deciduous hedge division or screen, &c. may be made s or limes, setting the larger plants e feet asunder, and a smaller one een. Or an ordinary fence, or sub- es, may be quickly formed of elder s, stuck in at two feet asunder, may be kept cut within bounds.

de body next the *south wall, as* d, is *best for the trees; and more*over for the many uses that may be made of it for the smaller early, or late tender esculents, and a few early cauliflowers. For the sake of a pleasant warm walk in spring, to have the south border narrow may be desirable; but on no account let it be less than six feet. Take care that this walk is not sunk too much; and that it have a bottom of good earth, as deep as where the trees are planted. Let the body of gravel be thin, and then the roots of the trees will be admitted to run properly under the walk, and find wholesome nourishment; where, if they were stopped by rubbish, they would be apt to canker, and irrevocably disease the trees.

The number and breadth of the walks must in a measure be determined by the quantity of allotted ground; exceedsng in these particulars where there is room. But few and wide walks are better than many and contracted. If the ground is laid out in autumn, defer the making of the walks till spring, when the earth will be settled. Gravel laid towards winter would be disturbed by the frost, and the necessary work about the quarters and borders. But whenever made, the garden ought to be brought to an exact level or slope, then the walks should be stumpt, keeping the tops of the stumps very level (as guides) to the true pitch of the quarters by a light line, made of good hemp, that will bear pulling tight. Proceed to take the earth out of the alleys about eight inches deep, which may be thrown towards the middle of the quarters, to give them a small convexity, which makes them look well.

Rake the bottom of the walk level, and lay the gravel to within two inches of the top of the stumps. The gravel will settle a little, but the walks should always be about three or four inches at their edge, below the quarters, or these will have a flat, and so a mean appearance.

If edgings are to be made, in order to separate between the earth and gravel, especially if of stone or wood, or box, they should be done first, and they will be a good rule to lay the box by.

If you have plenty of gravel, lay it moderately fine; if little, some small stones, or rubbish of any kind, may be laid in first, and rammed down level with a broad rammer; but do not spare for a little expence, if gravel can be had, as a thick coat of fine gravel will bear relaying, or turning over, to refresh it occasionally in the spring. As the gravel is laid, let the operator neatly rake the larger parts down to the bottom, leaving a fine surface, in a small degree convex, *i. e.* just barely sufficient to throw off wet; walks that lie very high in the middle are unpleasant to both eye and feet, and cannot be so well rolled and kept in order.

When deep walks of gravel are designed, for the sake of the mould dug out of the alleys, it should be forborne, and laid thin, if any trees are intended to be planted near the edge: for if the roots of trees have not a good soil to strike into, when they reach the walks, they will not prosper. *In laying gravel very thick it is a good way to do it* at two courses, the first *of which may* be rough, as it comes from

Grass walks may answer where gravel is scarce. Camomile has been also used to form green or carpet walks, planting it in sets about nine or ten inches asunder; which naturally spreading, the runners are fixed by walking on them, or rolling. Sand may be adopted for walks, but lay not any of it too thick, as it is the less firm for it. Coal-ashes strewed thinly in the alleys are better than nothing, as they at least serve to keep the feet dry. Sea-shells make very good walks.

All trees designed to be planted are to be thought of before winter. Those of the wall have been spoken of; and as to standards, they must have a fair depth of good soil to grow in; for it should be remembered, that tree-roots in a garden are prevented from running over the surface, as they do in an undisturbed orchard. It is necessary that some caution should be used not to dig the ground too near and too deep about garden trees, lest loosening the roots they should not be able to stand the wind; and because the nearer the surface any root grows, the more and choicer fruit the tree bears.

But the fewer standard trees in a garden the better, as they take up much room, and by their shade prevent the proper growth of vegetables that are near them; so that if a garden is small, there should be no trees except those of the wall. The case is different where there is ample room; and the blossoms of fruit-trees are so delightful, that if they produced nothing for the palate, there would be a sufficient inducement to plant them for ornament: but let them be dwarf standards in preference to espaliers.

Dwarf-standards occasion less trouble to keep them in order than espaliers, and are generally more productive: for espalier trees are seldom managed well, and thus appear unsightly: at best they are stiff and formal, and obstruct the sight in viewing the quarters of a garden, which,

feet allowed them.
mulberries, and filberts, a
paliered. The trees should
about a yard from the edge, b
is better, if the walks lie deep
poor materials.

Currants, gooseberries, and
do well espaliered, as to a
early and fine fruit.

Trees of a more humble
shrubs, next occupy attentio
ing a garden. Currants and
(as bushes) should be pla
from the edge, and full si
Some of these very useful
grow in every aspect of the
der to have a succession of
long as may be. Those w
plant whole quarters of
gooseberries ought to do it a
der in the rows, and the
from one another.

Raspberries may set in
rows five feet asunder, a
feet between the plants.
are always best by themsel
wise their suckers over-ru
Between rows of raspberr
the above distance, colew
bages, cauliflowers, and le
set, or spinach sowed in dr
berries having had their
dressing early in autumn,
Every year a little short m
close about the roots, (and
plantation gets older) w
fruit. Raspberries are not
soil and situation. The
or cane-rasp, is to be prefe
cipal crop. The large, w
werp, is also good.

Strawberries may be p
edges of borders and qu
single or double rows (
for the convenience of ga
ornament, but the comm
is, in four-feet beds, with

hem, and the alpines
it.
ime for planting the
st moist weather in
n earlier) that they
in the ground before
ll bear the better the
apt to throw up late-
jures, if not destroys
ed in spring often suf-
d bear very little the
he alpines. Choose
or planting, and let
full bearing, that is,
s old, for plants from
o fruitful. Press the
give them a watering,
twice if the weather
ardeners let them run
h in a dry light soil
t in this case, a greater
allowed them at plant-

s planted on a warm
sunder, and suffered
unners will fruit the
metimes this prolific
ll November.
ns of strawberries
every fourth year.
soil and with good
will continue lon-
they are suffered to
g frequently renewed
ed, beds have borne
rs.
strawberries should
oing it almost daily
d setting their fruit, if
s dry, particularly to
wall; but this is not to
the fruit is nearly ripe.
s may be dispersed
ous perennial flowers;
too near the edge,
the walks. The bul-
owever, be within six
crocusses and snow-

tichokes take up much
gardens may therefore
be of little use to have
t of asparagus-beds, as
few heads to cut at a
tes must be planted

be forgotten, but pro-
ary in that part of the
miest, and be shaded,
plants.
stationary things, the
sons must dictate the
nations of the palate
mory to take care of
necessary and agreea-
sing, and raw salads.
have been mention-
rect as many annuals
e cultivated, as room
be found for, that the
much as possible, orna-

rden with shrubs and
ould be had to their
gth, colour and season,
ay be properly varied,
re, and come in re-
The latter part of the year is seldom provided for so well as it might be; late flowers should be set in warm situations, as their proper place. In the most dreary months, by judicious planting, evergreens in their neat and cheerful "winter liveries" may be viewed from our windows, and serve instead of flowers.

Those who garden upon a large scale, should take care to have every thing proper and convenient liberally provided. Let there be a well-situated place for hot-beds, with some building as a tool-house, and (if dry) for keeping bulbs, seeds, and herbs. Those also who garden even upon a small scale will do well to have every needful implement.

If water can be introduced and kept clean with verdant banks around it, it would be found very useful where a garden is large; but let it be as near the centre as possible, as the most convenient situation. It should be fed from a pond in preference to a spring.

Mixed gardening, as comprehending the profitable with the pleasant, has been the subject hitherto; but if the flower garden and the kitchen garden are to be distinct, the case is altered; not so much indeed but that still the kitchen-garden should be adorned with a sprinkling of the more ordinary decorations, to skirt the quarters, chiefly those of the most powerful sweet scents, as roses, sweet-briars, and honey-suckles, wall-flowers, stocks, pinks, minionet.

The flower-garden, properly so called, should be rather small than large; and if a separate portion of ground is appropriated for this, only the choicest flowers should be introduced, and cultivated in the best manner. The beds of this garden should be narrow and consequently the walks numerous; and not more than one-half or two thirds the width of the beds, except one principal walk, all round, which may be a little wider. The gravel, or whatever the walks are made of, should lie about four inches below the edge. The beds for tulips, hyacinths, anemones, ranunculuses, &c. may be three and a half or four feet wide, and those for single flowers the same, or only two and a half feet wide in the borders. Let the beds lie rather rounded in the middle, but the walks flat.

Figured parterres have got out of fashion, as a taste for open and extensive gardening has prevailed; but when the beds are not too fanciful, but regular in their shapes, and chiefly at right angles, after the Chinese manner, an assemblage of all sorts of flowers, in a fancy spot of about 60 feet square, is a delightful home source of pleasure, worthy of pursuit. There should be neat edgings of box to these beds, or rather of neat inch boards, painted lead colour, to keep up the mould. Be sure to keep the box from the very first, as soon as rooted, and always after, as low as possible: clip it twice a year, April and July.

Landscape or picturesque gardening, is so much the work of fancy, and so much depends upon the situation, or what the celebrated Mr. Brown used to call the *capability of the place*, that no precise *rules can be laid down* concerning it, error is a trifle, but if cut down so, the consequence is serious, and has often been sorely lamented; extirpation should therefore be well thought of before it is executed; especially trees about houses, for many dwellings have been thus too hastily exposed, and deprived of comfortable shelter and shade.

Hilly spots that are in view of the house should be planted with firs, as fine looking trees, and very hardy. Beech does well on high ground, especially if chalky. In lowground, not to mention alders, and that tribe, the birch, and even the oak, should not be forgotten, where the wet does not long stand.

About the house some shady walks ought always to be provided, by thick planting, if not of trees, yet of flowering shrubs, and evergreens, of which the laurel will be found the most useful.

Those who have much space of ground to decorate do well to plant trees and shrubs of every kind, as enlarging the sources of amusement; but if the allotment of ground for this purpose is contracted, then, of course, those only should be planted, which by their neat foliage, natural symmetry, and gay flowers, may be truly esteemed ornamental.

The walks should always be wide, some inclining to serpentine, and contrived as much as possible upon a level, as walking up and down hills can hardly be called pleasure. That they may be extensive, they should skirt the grounds, and seldom go across them. In small pleasure-grounds the edges of the walks should be regularly planted with flowers, and long ones occasionally so, or with the most dwarf shrubs; and neat sheltered compartments of flowers, (every now and then to be met with) have a alleys of from a foot to eighteen in- between them.

e seasons proper for furnishing the d with every particular vegetable, d be well attended to, that each may ained as early as its nature will it; and of the seeds and plants we care must be taken to procure the of the kind, lest after all the trouble ltivation, disappointment as to qua- hould ensue.

eds and plants should be adapted as h as possible to the soil and situation h best suits them. The thinning of ing crops should be done in time, re the young plants have drawn one her up too much. All plants grow ger, and ripen better, when the air lates freely round them, and the sun t prevented from an immediate in- nce.

the Pricking and planting of crops, ure to do it as early as may be; let ry thing be regular. Shading of new- nted things, particularly flowers, is of ch benefit, and that in proportion as season is sunny.

trawberries and cauliflowers are gene- ly watered in a dry season; that is, the awberries when in bloom, in order to the fruit, and the cauliflowers when y shew fruit, in order to swell the ad. In very dry weather, asparagus edlings, early turnips, carrots, radishes, d small sallads, will need watering. s, cuttings, and layers of any kind, r need water. Pots of flowers must e it frequently.

When watering is undertaken, let it be a plete business, *i. e.* to the bottom and ent of the roots, as much as may be. tting the surface of the ground, how- er, in a summer's evening, makes a l atmosphere; a dew is formed, which vades the leaves, and helps to fill their austed vessels.

Watering the roots of wall-trees, (if dry ather) when the fruit is setting, is by ne thought necessary. To young trees y it can however be of use, for the roots old ones run far and wide; and it is the all fibres of these distant roots, on which tree chiefly depends for food. Vines ould have no water till they are off ssom, (July) and the fruit as big as ge pin's heads; and then if the season very hot and dry, watering the roots ice a week will help the fruit to swell. s watering is apt to make ground hide- und and unsightly, let the surface be asionally stirred and raked, which will ke future waterings enter the ground better. Many things are impatient of ing kept wet about the shanks, and refore watering should be generally at ttle distance. Rain water is the best watering, as appears by the verdure d vivacity it gives. Pond water is next fitness, and river water follows. Well ter is of least account, though local cumstances occasion its use the most. mp-water, if used directly, is so cold summer, that it is found prejudicial to ants: and great cold *so contracts their ssels, that they perform their proper ces with difficulty, and become dis- ed.*

*he management of a garden, as some-*what distinct from the cultivation of it, is an object of consequence; that is, to keep it in such order, that it may not fail in those general impressions of pleasure it is capable of affording, when things are shewn in their best manner. A garden may be cultivated so as to be profitable, and yet not conducted so as to be agreeable to walk in, which in a private garden is a circumstance surely to be lamented. The proper appearance of a well managed one is expressed by the word neat. Let all be done that can be in order to it.

To be neat, weeding must be industriously followed up, and all litter that is made in working, quickly carried off. The ground also should be frequently stirred and raked between crops, and about the borders, to give all a fresh appearance. There is a pleasantness to the eye in new-broken earth: and when there are no flowers left in the borders, this gives an air of culture, and is always agreeable. An asparagus-fork is expeditious and useful in this case; but it must be slightly used lest it disturb the roots of plants too much. Vegetables should not be suffered to rock themselves by wind, so as to form holes round their stems, but be well earthed up or otherwise supported.

Trees and shrubs should be constantly freed from suckers and dangling shoots, and wall trees ought to be regularly kept in order. Grass plats and walks should have their edges occasionally cut, and be mowed as often as there is the least hold for the scythe, for they lose much of their beauty when the grass gets long leaves should not be suffered to remain on them, as it stains the grass, and worm-casts should be cleared away. Edgings of all sorts should be kept in good order, as having a singularly neat effect in the appearance of a garden.

Some fruits may need support by tying their weak branches when they get heavy, to stakes, &c. Rows of raspberries and beans are kept neatly up in their lines, by putting in here and there a stake, and using packthread lengthwise; and thus will they bear better, and be more conveniently gathered. Strawberries of fine heavy sorts, will be preserved from getting dirty and rotten, by tying their stems to little sticks; by this practice the fruit also gets better ripened, and of a finer flavour. Some persons lay tiles or moss round the plants when the fruit is half-grown; but this is not, generally, so well, only it has the advantage in keeping the ground cooler in a hot season. The first and finest scarlets best deserve this trouble.

Flowers should be frequently tied up, and dead and dangling parts trimmed off. Some of them cannot do without support, and many sorts are made more secure and beautiful by proper ties. The sticks used for flowers should be of smooth wood, as neat painted slips of deal, with or without an ornamental head: white is the *best colour* on account of its contrast *with the leaves.*

Decaying flowers should be timely *trimmed* or removed, and perennials *should* be regularly freed from the parts *running* to seed, (except so much as may luxuriantly, and coming up the surer and quicker. If old seed is knowingly sown, some allowance in point of time must be made. Peas and beans of two years old, are by some preferred to new, as not running so much to straw.

As to the age of seeds at which they may be sown and germinate, it is uncertain, and depends very much how they are preserved.

Seeds should be saved from fine forward plants, secured from rocking about when they get tall; guard them against birds, gather them regularly as they ripen, lest they are shed and lost, and keep them dry. Curious flower-seeds are kept well in phials; others may be put into small drawers, and some hung up, or laid on shelves in their pods.

Seeds may be forwarded for sowing by various ways of promoting a germination before they are put into the ground. Broad and kidney beans may be put in soft water about 24 hours, to forward their growth, and to ascertain their vitality. The smaller seeds, as carrots, &c. may be prepared for sowing, by simply mixing them in a little moist sand, or fine earth, taking care that they do not lie longer than the usual time of their beginning to sprout.

The season for committing seeds to the ground should be as early as the nature of the plant to be cultivated will bear. Let this direction for early sowing be understood, not only of spring, but autumn crops; that the plants designed for winter use, or to stand for spring, may be strong, and well established in the ground, though for those designed for spring, it is adviseable to have two or three different sowings.

To be sure of a crop, and in some things a succession of crops, various sowings should be made through the year, at

small seeds go a great
a careful hand to distrib
though sowing a little too m
as to the value of seeds, y
come up crowded thick

It is not generally adva
veral sorts of seed on the
some persons are accustom

Some little things of this
be done; as a piece of
planted with horse-radish
ped with radishes or spina
crop of onions upon new
may also take place. drawi
young from about the pla

All seeds come up bes
rately pressed with the ea
lie too lightly in contact w
drought more easily affe
when once seeds begin
they are impatient of bot
seeds in is on the whole b
other presure. This do
mediately and neatly leve
rake, drawing off stones,
lightly, to avoid driving in
rake, which would remo
and make it come up irreg

Propagation by suckers
culture peculiar to tree
The things to be observed
are, to take them up with
the mother plant, so as n
root, nor the sucker's own
it up without properly lo
The earth should be move
trowel, and then the sucke
knife. Wherever a root
the part below should be
desired to succeed well,
by suckers, consider that
are tender: let them be tr
and planted immediately.
poor roots, must have their

commonly take
ore they bear
a therefore in a
remain undis-
to a flowering

a way of propa-
s. To this end,
taken up, and
ed, or cut asun-
ent, as the case
ife, however, to
ry small pieces.
hus splitting fi-
ober, but it may
ig, as February.
f woody plants
and shrubs are
their sap must
as those plants
trike (or rarely)
is bestowed or
e texture of the
somewhat soft,
not grow.
slips and cut-
mmer, as wall-
for most from
in general, the
however been
st time for all,
be in motion
f well-ripened
rth pressed to
hey are in the
six inches. Cut
slopewise, and
in a situation
e morning sun,
wet) by occa-
ather.
node of propa-
ted for almost
al sorts of fruit-
that will grow
that will not.
wer branches of
young and plia-
ut breaking to
six inches in
light or heavy,
ld securely by

layers be kept
ngs, and laying
r rather small
a will not har-
t of the ground
by a tie to a
slit with a sharp
as in carnation
an inch; and
out the part, at
help the layer
ayers should be
ches above the
, be it more or

branches low
he ground, and
head down for
ots or suckers,
ixing a broken
the side, to the
a branch. A
ugh, may be
a garden-pot
th, and sup-

ported by some contrivance, and shaded by some means, and in both cases water frequently the buds drawn through the hole of the pot. By this contrivance rooted plants being procured in pots, may be turned out with the earth about their roots undisturbed. A branch of a vine thus layered in November, may be next year cut off, when the fruit is ripe, brought in a pot to table, and afterwards planted out. For propagation of fruit-trees by grafting, see that article.

GARDEN *snail.* See *Helix.*

GARIDELLA, in botany, a genus of the decandria trigynia class and order. Natural order of multisiliquæ. Ranunculaceæ, Jussieu. There is but one species, viz garidella nigellastrum, fennel-leaved garidella.

GARLIC, in botany, see *Allium.* This root has been subjected to chemical analysis: and is found to consist of albumen, mucilage, fibrous matter, and water.

GARNET, in mineralogy, is a species of the flint genus, of which there are two sub-species, viz. the precious, and common. The precious or oriental is red, but of various shades. It occurs most commonly crystallized, either as a dodecaedron, or as a double eight-sided pyramid. Its specific gravity is about 4.3, and it consists of silica, 35.75; alumina, 27.25; oxide of iron, 36.0; manganese, 0.25. Before the blow-pipe it melts into a black enamel.

The common garnet is brown or green, is not so heavy as the precious, and is composed of silica, 26.46, alumina, 22.70; lime, 17.91; iron, 16.25. It is more easily melted than the precious garnet.

The garnet varies more than any other gem, both in the form of its crystals, and in its colour; some being of a deep red, some yellowish or of a purple tint, and others brown, blackish, and quite opaque. They are generally of a spherical form, and never crystallize with less than 12 sides. The prevailing colour is a fine red, and the mean size that of a large pea, though they are found from the size of a grain of sand to three or four inches in diameter. Those imbedded in granite are the smallest, but the most transparent. Among the oriental garnets may be distinguished three different shades, known in commerce by as many different names. The garnet of a fine red colour, and free from mixture is called a carbuncle. Garnets are found in almost every country where primitive rocks exist. Switzerland and Bohemia are the two countries in Europe which furnish them in the greatest abundance. The impure garnets are used to advantage as a flux when they are found near iron-mines, as they not only facilitate the fusion of that metal, but add something to the mass by contributing a portion of iron.

GARNET, in a ship, is a tackle having a pendant coming down from the main-mast, with a block well seized to the main stay, just over the hatchway, to which a guy is fixed to keep it steady; and at the other end is a long tackle-block, in which the fall is reeved to haul and hoist goods into or out of the ship.

GARNISH, in law-books, signifies to warn.

the garrison should always be stronger than the townsmen. Garrison or winter quarters signify a place where a number of forces are laid up in the winter season, without keeping the regular guard.

GARRISON GUNS, such as are mounted and used in a garrison, consisting of the following weights, viz. the 42, 34, 24, 18, 12, 9, and 6 pounders, being made either of brass or iron.

GARTER, *order of the*, a military order of knighthood, instituted by King Edward III. It consists of 26 knights companions, generally princes and peers, whereof the King of England is the sovereign or chief. They are a college or corporation, having a great and little seal. Their officers are a prelate, chancellor, register, king at arms, and usher of the black rod. They have also a dean with 12 canons and petty canons, vergers, and 26 pensioners or poor knights. The prelate is the head. This office is vested in the bishop of Winchester. Next to the prelate is the chancellor, which office is vested in the bishop of Salisbury, who keeps the seals, &c. The next is the register. The fourth officer is garter and king at arms, being two distinct offices united in one person. Garter carries the rod and sceptre at the feast of St. George, the protector of his order, when the sovereign is present. He notifies the elections of new knights, attends the solemnity of their installations, carries the garter of the foreign princes, &c. He is the principal officer within the college of arms, and chief of the heralds. The college of the order is in the castle of Windsor, with the chapel of St. George, and the chapter-house, erected by the founder for that purpose. The habit and ensign of the order are a garter, mantle, cap, george, and collar. The first four were assigned the knights-compa-

granulated zinc and one
sulphuric acid diluted w
weight of water: a cubic i
contains about a quarter of
arsenic air.

GAS, *carburetted hydrog*
several varieties of this gas,
holding different proportio
solution, according to the p
it is obtained. The gas of
which may be procured
mud at the bottom with a
lecting the gas, as it rises
an inverted bottle, is this
also the fire-damp of coal

Gas from coal, peat, and
ces, has been used as a sub
and candles.

GAS, *phosphuretted hy*
procured by boiling in
phosphorus, with a soluti
ash. The gas is disengag
bles, which cover the
the fluid, and take fire
air. The ignis fatuus, or
tern, is supposed to be
gas, arising from the pu
mal substances in swamp

GAS, *sulphuretted hydr*
formerly termed hepatic
tained by adding diluted
a solution of sulphuret of
which evolves it with
cence; it is characterised
smell, resembling that
See *Sulphur*.

The waters called sulp
tic, as those of Harrowg
of this gas.

GAS, *oxygenized muria*
which is a compound of
oxygen, presents anothe
theory of acidification;

us, killing even
nd destroying
the flame of a
ar.
is is the gaseous
pound of nitro-
rtion of oxygen
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more energy and rapidity the more the food is divided, and its action is increased by a warm temperature. The food is not merely reduced to very minute parts; its taste and smell are quite changed; its sensible properties are destroyed, and it acquires new and very different ones. This fluid does not act as a ferment, it is a powerful antiseptic, and even restores flesh already putrefied.

GASTROBRANCHUS, in natural history, a genus of fishes, of the order cartilaginei. Generic character: mouth beneath, furnished with pectinal teeth, in a double row on each side; body eel-shaped, carinate beneath by a soft fin, two ventral spiracles. G. cœcus or the hag-fish, is about five inches in length, in the European seas, but, in those of India attains the length of a common eel. It is characterised by the circumstance of exhibiting no traces of the existence of such an organ as the eye. It will often enter the mouths of fishes fixed on the hook of the angler and knaw a passage through their bodies devouring all but the bones and skin. Its substance is so highly glutinous, that a large vessel of sea water will, in a short time after the living cœcus is placed in it, become of the consistence of jelly.

GASTROGRAPHY, the operation of sewing up wounds of the abdomen.

GATE, in architecture, a large door, leading or giving entrance into a city, town, castle, palace or other considerable building: or a place giving passage to persons, horses, coaches, or waggons, &c.

GAVELKIND, a tenure or custom in Kent, by which the lands of the father are, at his death, equally divided among all his sons; or the land of a deceased brother, in case he leaves no issue, among all his brethren. This custom came from our Saxon ancestors, among whom the inheritance of lands did not descend to the eldest, but to all the sons alike; and was retained in Kent, because the Kentish men were not conquered by the Normans. The customs attending this tenure are, that the heir, at the age of fifteen, may give or sell his lands in gavelkind; and though the father is attainted of treason, and suffers death, the son inherits. A wife shall be endowed of a moiety of the gavelkind-lands, of which her husband died seised during her widowhood. Likewise a husband may be tenant by courtesy of half his wife's lands, without having any issue by her; but if he marries again, not having issue, he forfeits his tenancy.

GAUGE-POINT, of a solid measure, the diameter of a circle, whose area is equal to the solid content of the same measure. Thus, the solidity of a wine-gallon being 231 cubic inches, if you conceive a circle to contain so many inches the diameter of it will be 17.15; and that will be the gauge-point of wine-measure. And an ale gallon containing 282 cubic inches, by the same rule, the gauge-point for ale-measure will be found to be 19.15. After the same *manner, may the gauge-point of any foreign measure be obtained; and from hence may be drawn this consequence, that when the diameter of a cylinder, in inches, is equal to the gauge-point of any measure,* given likewise in inches, every

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a cooler be a parallelogram of
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Then, as the mean diameter is to 100, so is the reserved difference to a versed line in the table; and if the segment (to be found in the table) be multiplied, as before shewn, into the contents, the product will be the quantity of liquor in the cask.

Example. Let the bung-diameter be 32, the mean-diameter 29.6, and the whole measure 97.4 gallons; say there be 19 inches wet:

From	32.0	From	90	
Deduct	29.6	take	1.2	
remain	2.4	remain	17.8	reserved
its half is	1.2			

Now as 29.6 is to 100, so is 17.8 to .60, the versed sine. The segment to 60 is .6265; which, multiplied by 97.4, the whole contents, the product gives 61 gallons of liquor remaining. By working upon the dry inches, you would have found the ullage, or deficiency.

the Segment of a Circle, whose Area is Unity.

ent.	V.S.	Segment.	V.S	Segment.	V.S	egment.
17	99	.9983	26	.2066	74	.7934
48	98	.9952	27	.2178	73	.7822
87	97	.9913	28	.2292	72	.7708
134	96	.9866	29	.2407	71	.7593
187	95	.9813	30	.2523	70	.7477
245	94	.9755	31	.2640	69	.7360
308	93	.9692	32	.2759	68	.7241
375	92	.9625	33	.2878	67	.7122
446	91	.9554	34	.2998	66	.7002
20	90	.9480	35	.3119	65	.6881
598	89	.9402	36	.3241	64	.6759
80	88	.9320	37	.3364	63	.6636
764	87	.9236	38	.3487	62	.6513
51	86	.9149	39	.3611	61	.6389
941	85	.9059	40	.3735	60	.6265
33	84	.8967	41	.3860	59	.6140
27	83	.8873	42	.3986	58	.6014
224	82	.8776	43	.4112	57	.5888
23	81	.8677	44	.4238	56	.5762
24	80	.8576	45	.4364	55	.5636
6	79	.8474	46	.4491	54	.5509
31	78	.8369	47	.4618	53	.5382
37	77	.8263	48	.4745	52	.5255
45	76	.8155	49	.4873	51	.5127
55	75	.8044	50	.5000	50	.5000

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ble line of diagonals, one appropriated to wine, the other to beer measure. By inserting the lower end of the rod at the bung of a cask, and directing it obliquely so as to touch the junction of the head and stave, and noting the figures which stand opposite the centre of the interior of the bung-hole, the measurement is taken: In this process care must be taken to measure towards both chines, because a cask *has not* always the bung truly centrical: *when* any difference appears, the medium of the two measurements serves as a standard. Open vessels may be measured in the same way, by measuring the oblique line from the surface, or one side to allowance for such anomalies.

GAULTHERIA, in botany, a genus of the decandria monogynia class and order. Natural order of bicornes. Essential character; calyx, outer two leaved, inner five-cleft; corolla ovate; nectary with ten-dagger points; capsule five-celled, covered with the inner calyx, now become a berry. There are two species.

GAURA, in botany, a genus of the octandria monogynia class and order. Natural order of calycanthemæ. Essential character: calyx four-cleft, tubulous; corolla four-petalled, rising towards the upper side; nut inferior, one seeded, four-cornered. There is but one species.

GAURS, an antient sect of the magicians in Persia. They profess the worship of one God alone, the belief of a resurrection and a future judgment, and utterly detest all idolatry. They perform their worship before fire, for which they have an extraordinary veneration, as believing it to be the most perfect emblem of the Deity.

GAUZE, in commerce, a thin transparent stuff, sometimes woven with silk, and sometimes only of thread, either plain or figured: the latter being sometimes worked with flowers of silver or gold on a silk ground.

GAZELLA. See *Antelope.*

GAZETTE, a printed account of the transactions of all the countries in the known world, in a loose sheet or half sheet. This name is with us confined to that paper of news published by authority.

The first gazette in England was published at Oxford, Nov. 7, 1665. On the removal of the court to London the gazette was published there. In it are recorded all commissions and promotions in the army, all state

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and where there is occasion to send his orders by his aids-de-camp. At a siege he is to cause the place to be invested; to order the approaches and attacks; to visit the works, and to send out detachments to secure his convoys.

GENERAL ISSUE, in law, is that plea which traverses and denies at once the whole declaration or indictment, without offering any special matter, whereby to evade it, and it is called the general issue, because by importing an absolute and general denial of what is alleged in the declaration, it amounts at once to an issue; that is, a fact affirmed on one side and denied on the other.

GENERAL TERMS, among logicians, those made the signs of general ideas.

GENERAL of HORSE, and *general of foot*, are posts next under the general of the army.

GENERAL of the ARTILLERY. See *Ordnance.*

GENERAL is also used for a particular march or beat of drum, being the first which gives notice, for the infantry to be in readiness to march.

GENERAL is also used for the chief of an order of monks.

GENERATING *line*, or *figure*, in geometry, is that which by its motion produces any other plane or solid figure. Thus a right line moved any way parallel to itself, generates a parallelogram.

GENERATION. See *Physiology.*

GENERICAL *name*, in natural history, the word used to signify all species of natural bodies, which agree in certain essential and peculiar characters, and are therefore all of the same family or kind; so that the word used as the generical name, equally expresses every one of them, and some other words expressive of the peculiar qualities of figures of each are added, in order to denote them singly, and make up what is called the specific name. Thus the word rosa or rose, is the generical name of the whole series of flowers of that kind, which are distinguished by the specific names of the red-rose, the white-rose, the apple-rose, &c.

GENESIS, among mathematicians, the formation or production of some figure or quantity.

GENEVA, *gin*, a hot fiery spirit, too much used by the lower classes of people in this country, as a dram, and most injurious to their constitution and morals. A liquid of this kind was formerly sold in the apothecaries shops, drawn from the juniper-berry, but the liquor now sold under the name of geneva or gin is composed of oil of turpentine and malt spirits. The Hollands geneva is manufactured chiefly at a village near Rotterdam, from French brandy and juniper berries.

GENIOSTOMA, in botany, a genus of the pentandria monogynia class and order. Essential character: calyx turbinate; five cleft; corolla one-petalled, with a villose throat, and a five-parted border; capsule oblong, *two-celled*, many seeded. There *is but one species*, a native of the isle o *Tanna in the South Seas.*

GENISTA, in botany, a genus of the *diadelphia* decandria class and order. *Natural* order of papilionaceæ or legu-

[illegible] two [illegible] ved, [illegible] natural [illegible] species. The most [illegible] are the lutea or common gentian, the root of which is an excellent stomachic bitter; and the lesser centaury.

GENUS, among metaphysicians and logicians, denotes a number of beings which agree in certain general properties common to them all.

GENUS, in natural history, a subdivision of any class or order of natural beings, whether of the animal, vegetable, or mineral kingdoms, all agreeing in certain common characters.

GEOCENTRIC *latitude of a planet*, is its distance from the ecliptic as it is seen from the earth.

GEOCENTRIC, *place of a planet*, the place wherein it appears to us from the earth, supposing the eye there fixed.

GEODÆSIA. See *Surveying.*

GEOFFROYA, in botany, a genus of the diadelphia decandria class and order. Natural order of papilionaceæ. Essential character: calyx five cleft, drupe ovate; nut flatted. There are two species.

GEOGRAPHY, is that science which exhibits the results of our investigations respecting the planet we inhabit, whether we consider its figure and the disposition of the lands and water upon its surface, or the subdivisions which the different nations who inhabit it have made, by which it is considered as forming kingdoms and states.

Among the divisions of this science may be named sacred geography, solely employed in the illustration of the scriptures; ecclesiastical geography, which describes

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See *Equinoxes, precession of.*
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ferent in different countries. The most remarkable of these circumstances is the duration of the light, not only of the sun himself, but of the twilight before he rises and after he sets. In the equatorial regions, darkness comes on very soon after sun-set. In our climate the twilight always continues about two hours, and during the summer season in a considerable degree during the whole night. In countries farther to the northward or southward, the twilight becomes brighter and brighter as we approach the poles, until at last the sun does not appear to touch the horizon, but goes in a circle at some distance above it for many days successively. In like manner, during the winter, the same luminary shines lower and lower, until at last he does not appear at all; and there is only a dim twinkling of twilight for an hour or two in the middle of the day. By reason of the refraction of the atmosphere, however, the time of darkness, even in the most inhospitable climates, is always less than that of light. In the warmer climates the sun has often a beautiful appearance at rising and setting, from the refraction of his light through the vapours which are copiously raised in those parts. In the colder regions, halos, parhelia, aurora borealis, and other meteors, are frequent; the two former owing to the great quantity of vapour continually flying from the warm regions of the equator to the colder ones of the poles. In the high northern latitudes, thunder and lightning are unknown, or but seldom heard of; but the more terrible phenomena of earthquakes, volcanoes, &c. are by no means unfrequent. These, however, seem only to affect islands and the maritime parts of the continent.

Notwithstanding the seeming inequality in the distribution of light and darkness, however, it is certain, that throughout the whole world there is nearly an equal proportion of light diffused on every part, abstracting from what is absorbed by clouds, vapours, and the atmosphere itself. The equatorial regions have indeed the most intense light during the day, but the nights are long and dark; while, on the other hand, in the northerly and southerly parts, though the sun shines less powerfully, yet the length of time that he appears above the horizon, with the greater duration of the twilight, compensates for the seeming deficiency.

Were the earth a perfect plane, the sun would appear to be vertical in every part of it: for, in comparison with the immense magnitude of that luminary, the diameter of this globe itself is but very small; and as the sun, were he near to us, would do much more than cover the whole earth, so, though he were removed to any distance, the whole diameter of the latter would make no difference in the apparent angle of altitude. By means of the globular figure of the earth also, along with the great disparity between the di*ameters of the two* bodies, some advan*tage is given to the day over the night; for thus the* sun, being immensely the *larger of* the two, shines upon more than *one half of* the earth; whence the unen*lightened* part has a shorter way to go be-supposed to be extended as far as the earth, and marked on its surface; and in like manner we may imagine as many circles as we please to be described on the earth, and their planes to be extended to the celestial sphere, till they mark concentric ones on the heavens. The most remarkable of those supposed by geographers to be described in this manner are the following:

1. The horizon. This is properly a double circle, one of the horizons being called the sensible, and the other the rational. The former comprehends only that space which we can see around us upon any part of the earth, and which is very different according to the difference of our situation. The other, called the rational, is a circle parallel to the former, and passing through the centre of the earth, supposed to be continued as far as the celestial sphere itself. To the eyes of spectators there is always a vast difference between the sensible and rational horizons; but from the immense disparity betwixt the size of the earth and celestial sphere, planes of both circles may be considered as coincident. Hence in geography, when the horizon or plane of the horizon, is spoken of, the rational is always understood when nothing is said to the contrary. In consequence of the round figure of the earth, every part has a different horizon. The poles of the horizon, that is, the points directly above the head, and opposite to the feet of the observer, are called the zenith and nadir.

2. The great circle described upon the sphere of the heaven, and passing through the two vertical points, is called a vertical circle, or an azimuth: and of these we may suppose as many as we please all round the horizon. In geography every

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as at present, but always in circles, cutting the horizon at right angles; but in an oblique sphere the angle varies according to the degree of obliquity, and the position of the axis of the sphere with regard to the sun. Hence we easily perceive the reason of the sun's continual change of place in the heavens; but though it is certain that this change takes place every moment, the vast distance of the luminary renders it imperceptible for some time, unless to very nice astronomical observers. Twice a year he is in the equator, and then the days and nights are nearly equal all over the earth. This happens in the months of March and September; after which the sun proceeding either northward or south according to the season of the year and the position of the observer, the days become longer or shorter than the nights, and summer or winter comes. The secession of the sun from the equator either northward or southward is called his declination, and is either north or south according to the season of the year, and when this declination is at its greatest height, he is then said to be in the tropic. The space between the two tropics, called the torrid zone, extends 47 degrees of latitude all round the globe; and throughout the whole of that space the sun is vertical to some of the inhabitants twice a year, but to those who live directly under the tropics only once. Throughout the whole torrid zone also there is little difference between the length of the days and nights.

From an observation of the diversity in the length of the days and nights, the rising and setting of the sun, with the other phenomena already mentioned, geographers divide the surface of the earth into certain districts, which they called climates: but this division is of no practical utility; nor does it furnish any criterion for judging of the climate in a meteorological sense.

From the various appearances of the sun, and the effects of his light and heat upon different parts of the earth, the division of it into zones has arisen. There are five in number. 1. The torrid zone, lying between the two tropics for the space of 47 degrees of latitude. This is divided into two equal parts by the equator. 2. The two temperate zones lie between the polar circles and the tropics, containing a space of 43 degrees of latitude. And, 3. The two frigid zones lie between the polar circles and the poles. In these last the longest day is never below 24 hours: in the temperate zones it is never quite so much, and in the torrid zone it is never above 14. The zones are named from the degree of heat they were supposed to be subjected to. The torrid zone was supposed by the antients to be uninhabitable, on account of its heat; but this is now found to be a mistake, and many parts of the temperate zones are more intolerable in this respect than the torrid zone itself. Towards the polar circles also these zones are intolerably cold *during the* winter season. Only a small *part of the* northern frigid zone, and none *of the southern*, is inhabited. Some *geographers reckoned* six zones, dividing the *torrid zone into* two by the equator.

Besides these there are other technical which a peninsula is joined to a continent or two continents together; as the isthmus of Suez, which joins Africa to Asia. A promontory, or cape, is a high part of land which stretches into the sea: thus the Cape of Good Hope is a promontory. An ocean is a vast collection of waters surrounding a considerable part of a continent; as the Atlantic. A sea is a smaller collection of water; as the Black Sea. A gulf is a part of the sea which is nearly surrounded with land; as the gulph of Venice. A bay has a wider entrance than a gulf: as the Bay of Biscay. A strait is a narrow passage that joins two seas; as the strait of Gibraltar, which joins the Mediterranean to the Atlantic. A lake is a large collection of water entirely surrounded by land, having no visible communication with the sea; as the Caspian Lake in Asia. A river is a stream of water that has its source from a spring, which keeps constantly running till it falls into some other river, or into the sea.

The antients considered the globe under the three grand divisions of Asia, Europe, and Africa. Modern discoveries have added a fourth division, that of America, which exceeding even Asia in size, might have been admitted under two grand and distinct denominations, limited by the isthmus of Darien. The vast extent of New Holland seeming too large to be ranked among islands, and too small for a continent, eludes the petty distinctions of man; and geographers hesitate whether to ascribe it to Asia, or to denominate it a fifth specific division of the earth. By some it is called Australasia.

Of the grand divisions of the earth, Asia has ever been esteemed the most populous; and is supposed to contain five hundred millions of souls, if China, as has

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The solid masses of the globe, which have come within our examination, have been distinguished into primitive and secondary: among the former, were placed the rocks, of granite, gneiss, porphyry, serpentine, and limestone, of a peculiar character; and, among the latter, were considered the rocks of secondary limestone, of phosphate of lime, of gypsum, and of some of the sand-stones; of chalk, and of silex. This division is not, however, at present universally adopted; other divisions having been assumed, which have appeared to agree better with the different systems which have been proposed. The water is supposed, at present, to cover about three-fifths of the whole earth; but undoubted evidence exists, of its having extended over a much wider surface; having according to many of the most eminent geologists, covered the whole of the earth.

Herodotus relates, that, according to the priests of Vulcan, the whole of Egypt except in the neighbourhood of Thebes, had been covered with water. Herodotus himself, also noticed the existence, even in his time, of lakes of salt water in different parts of Egypt, as well as of the saline matter, mingled with the vast tracts of sand with which that country is covered. The diminution of the ocean is also rendered in the highest degree probable, from various facts related also by Strabo, Pliny, Diodorus the Sicilian, and several other early writers; and in the present day, the observations of Pallas, Celsius, Linnæus, and others, seem to establish the fact, of the diminution and sinking both of the Baltic and of the Caspian Seas.

On the other hand, innumerable facts may be adduced which seem to prove, that the water has actually increased, in its proportion, over the dry land. From the relations of Plaucus, Bryden, Barral, Fortis, and others, there can no doubt exist of the Mediterranean Sea having very much encroached on its shores; temples, and other edifices of different descriptions which are known to have been erected at considerable distances from the sea, being now buried beneath its waves. In explanation of this varying evidence, it is necessary to state that whilst the land is gaining on the sea, in some parts, similar encroachments are observable in others, of the sea on the dry land. The balance, however, is undoubtedly in favour of the opinion, that the water has considerably diminished.

Indubitable evidence of the water having stood over the tops of mountains, which are at present much above the level of the ocean, is yielded, by the circumstance of various organized beings, former inhabitants of the water, being imbedded in these mountains, and even *their summits*. Those who contend that *the whole of the earth* has been covered *with water*, have recourse to the testimony afforded by the several chemical and physical properties, discoverable in the

These waters, it was supposed, had retired to the interior cavities of the globe, remaining in this great abyss, ready to issue out and produce the most extensive nundations; to one of which it was supposed that some of their records referred. The axis of the globe, they believed to have been originally parallel with that of the plane of its orbit; and whilst it remained thus, they supposed that a perpetual spring existed; but that, on its inclining, an alteration of seasons took place.

The Chaldæans, like the Egyptians, believed the earth to be hollow; and that, in the early ages of its formation, a perpetual spring had existed. The Indians also believed in the existence of a vast abyss in the centre of the earth, for the reception of the water, which remained after the consolidation of the crust of the earth: they also believed in a general deluge of the earth, and in a subsequent retiring of the waters.

The opinions of the Epicureans, appear to have been, that by the separation and appropriate re-union of accordant atoms; the different elements were formed, which by the regulating influence of gravity, were separated from each other, and disposed in their allotted regions. One of the processes which was thus performed, was the formation of the earth itself; which being then variously acted upon, underwent those alterations of its surface, from which proceeded the vast cavities for the reception of the ocean, and those irregularities which divide its surface into hills and vallies.

Des Cartes conceived that this globe might originally have been composed, like the sun, of the pure element (fire); but that by degrees its less subtle parts had gradually collected together, and formed

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We shall now proceed to take a view of those in which the formation of the earth is described, as having been produced by the influence of water.

Woodward supposed that the solid parts of the earth were arranged in strata, according to their degrees of specific gravity; the water which had held them in solution, having afterwards retreated to the grand abyss which he supposed to exist in the centre. After some time, God ordained that the crust should break and fall into the abyss, and that the water should cover the surface. By the great solvent powers of this water, he supposed that every thing was again dissolved, and that afterwards they were again precipitated in concentric layers. The surface was then supposed to have been again broken, by which the waters again reached the centre, and the broken surface yielded those inequalities which now exist.

De Luc conceived, that in the beginning the sun did not exist in a luminous state, and that the earth, not feeling its influence, was frozen; but that, as the sun diffused its rays, the ice on the earth's surface became thawed, and penetrating inwards, dissolved the earth and other frozen matters to the depth of several leagues below the surface. But the thaw having reached this point, he supposes that the dissolved substances became either crystallized or precipitated, and that as they solidified they formed the primitive crust of the earth. After this, organized beings were created, many of which became involved in new strata, (the secondary) which were now formed at the bottom of the ocean; and the thawing of the internal parts of the globe con-formed the opinion, that in the beginning, all the matters which now compose the exterior part of the globe were held in solution, or suspension in a fluid; and that, of these, some were deposited in a crystallized state, as the granite, &c. whilst those which were not in a state of actual solution, formed the different schists and other earthy, saline, and metallic strata, regularly and concentrically disposed. Whilst thus existing in a soft and yielding state, the different substances, by acting on each other, he supposes to have passed into a state of fermentation, necessarily productive of a swelling or raising up, which taking place first of all in the granitic and saline pasty masses, these were elevated, carrying with them, or bursting through, the other strata, thus forming the rocks and mountains, now existing on the face of the earth.

Mr. Kirwan has endeavoured to form a system which may accord with the Mosaic account of the creation. He supposes the superficial parts of the globe to have been in a fluid state, being held in solution by water considerably heated. From the coalescing and crystallization of the contents of this solution, the various metallic substances, the different earths, &c. are deposited, in various combinations, forming, according to the predominant proportion of the ingredients, granite, gneiss, porphyry, and the other primeval rocks. By the crystallization of these immense masses, a prodigious quantity of heat was generated, even to incandescence, and the oxygen uniting with inflammable air, occasioned a stupendous conflagration, by which the solid basis on which the chaotic fluid rested, was rent to a great extent. From the extrication, by this heat, of the oxygen and nitrogen gases

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Most of the rocks which have been just enumerated are covered by a great formation, which is named the newest flœtz trap. This formation also covers many of the high primitive mountains; it has but little continuity, but is very widely distributed. It contains considerable quantities of mechanical deposits, such as clay, sand, and gravel. The remains both of vegetables and animals also occur very abundantly in these deposits. Heaps of trees and of parts of plants, and an abundance of shells and other marine productions, with the horns of stags, and great beds of bituminous fossils, point out the lateness of the period when the formation was deposited. In this formation several rocks occur which are also met with in other flœtz formations; but the following are supposed to be peculiar to this class, basalt, wacke, grey-stone, porphyry, slate, and trap tuff. These rocks are said to have been formed during the settling of the water consequent to a vast deluge, which is supposed to have taken place when the surface of the earth was covered with animals and vegetables, and when much dry land existed. From various appearances observed in these rocks, it is concluded, that the waters in which they were formed had risen with great rapidity, and had afterwards settled into a state of considerable calmness.

The collections and deposits derived from the materials of pre-existing masses, worn down by the powerful agency of air and water, and afterwards deposited on the land or on the sea coasts, are termed alluvial, and are, of course, of much later formation than any of the preceding classes. These deposits may be divided into, 1. Those which are formed in mountainous countries, and are found in vallies, being composed of rolled masses, gravel, sand, and sometimes loam, fragments of ores, and different kinds of precious stones. 2. Those which occur in low and flat countries, being peat, sand, loam, bog iron ore, breccia, tufa, and stalactite. See *Mineralogy* and *Rocks*.

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$y^2 + ax + b \cdot y + cx^2 + dx + e \cdot y + fx^3 + gx^2 + hx + i = 0$; as the cubical parabola, the cissoid, &c. And a line of an infinite order, is that which a right line may cut in infinite points; as the spiral, the cycloid, the quadratrix, and every line that is generated by the infinite revolutions of a radius, or circle, or wheel, &c.

In each of those equations, x is the abscissa, y its corresponding ordinate making any given angle with it; and a, b, c, &c. are given or constant quantities, affected with their signs + and —, of which one or more may vanish, be wanting or equal to nothing, provided that by such defect the line or equation does not become one of an inferior order.

GEOMETRICAL *solution* of a problem, is when the problem is directly resolved according to the strict rules and principles of geometry, and by lines that are truly geometrical.

GEOMETRICAL progression or proportion. See *Algebra*.

GEOMETRY, the science and doctrine of local extension, as of lines, surfaces, and solids, and that of ratios, &c.

The name of geometry literally signifies measuring of the earth, as it was the necessity of measuring the land that first gave occasion to contemplate the principles and rules of this art, which has since been extended to numberless other speculations; insomuch that, together with arithmetic, geometry forms now the chief foundation of all the mathematics.

Herodotus and Proclus ascribe the invention of geometry to the Egyptians, and assert that the annual inundations of the Nile gave occasion to it; for those waters bearing away the bounds and landmarks of estates and farms, covering the face of the ground uniformly with mud, the people, say they, were obliged every year to distinguish and lay out their lands by the consideration of their figure

Definitions or
1. A methematica
length, breadth, or
definition it may
that a mathematical
nor felt; it can only
is commonly called
made with a pen
of a needle, is not
tical point; for how
may be, yet if it
magnifying glass, i
an irregular spot,
length and breadth
able to measure i
naked eye, arises o
2. A line is leng
thickness. A line
imagined. The en
3. Parallel lines
keep at the same
other, and which
far, would never
metry, fig. 1.
4. A right line i
called a straight l
every where the sa
5. A curve is a
changes its directio
points.
6. An angle is th
ing of two lines m
2.
7. The lines AB
the angle, are cal
and the point B,
called the vertex o
gular point. An
pressed by a lette
as the angle B, fig.
by three letters,
the middle the le
the other two are
leg, as the angle A
8. When one li
so as not to lean
another, both the

he other line equal to
instance if the angles
equal, the line AB is
CD, whatever may be
r respects,
ne BE (fig. 3), stands
, so as to incline, the
s greater than a right
obtuse angle; and that
a right angle is called
the angle EBD.
which have one leg in
gles ABC and ABE, are
angles, or adjoining
ch are produced by the
ies, as the angles EBD
y CD and EF, crossing
lled opposite or verti-

bounded space, and is
a solid.
, or surface, has length
The extremities of a
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plane surface, is that
ere perfectly flat and
l touch every part of a
tever direction it may
e top of a marble slab,
example of this, which
touch in every point,
see light any where

ace is that which will
straight line in any
faces may be either

face is when the sur-
middle; as, for in-
outside of a globe.
rface is when it sinks
hollow, and is the

e bounded either by
d lines, or both these.
bounded by straight
d a polygon. If the
it is called a regular
e unequal, it is called
on. Every polygon,
nequal, has the same
angles, and they are
imes according to the
d sometimes from the
they contain. Thus a
is called a triangle,
sides a quadrangle.
polygon of five sides;
des; a heptagon se-
on eight sides; a no-
decagon ten sides;
en sides; a duodeca-
See *Pentagon*, &c.
a greater number of
call them polygons of
and so on.
fferent kinds, accord-
their sides.
l triangle has all its
, fig. 4.
angle has two equal

ngle has all its sides
g. 6.
denominated accord-
ey contain.
d triangle is one that
e, as ABC, fig. 7.

22. A triangle cannot have more than one right-angle. The side opposite to the right-angle B, as AC, is called the hypothenuse, and is always the longest side.

23. An obtuse-angled triangle has one obtuse-angle, as fig. 8.

24. An acute-angled triangle has all its angles acute, as fig. 4.

25. An isosceles, or a scalene triangle, may be either right-angled, obtuse, or acute.

26. Any side of a triangle is said to subtend the angle opposite to it: thus AB, (fig. 7) subtends the angle ACB.

27. If the side of a triangle be drawn out beyond the figure, as AD (fig. 8), the angle A, or CAB, is called an internal angle, and the angle CAD, or that without the figure, an external angle.

28. A quadrangle is also called a quadrilateral figure. They are of various denominations, as their sides are equal or unequal, or as all their angles are right-angles or not.

29. Every four-sided figure whose opposite sides are parallel, is called a parallelogram. Provided that the sides opposite to each other be parallel, it is immaterial whether the angles are right or not. Figs. 9, 10, 11, and 12, are all parallelograms.

30. When the angles of a parallelogram are all right-angles, it is called a rectangular parallelogram, or a rectangle, as figs. 11 and 12.

31. A rectangle may have all its sides equal, or only the opposite sides equal. When all its sides are equal, it is called a square, as fig. 12.

32. When the opposite sides are parallel, and all the sides equal to each other, but the angles not right angles, the parallelogram is called a rhombus, as fig. 10.

33. A parallelogram having all its angles oblique, and only its opposite equal, is called a rhomboid, as fig. 9.

34. When a quadrilateral, or four-sided figure has none of its sides parallel, it is called a trapezium, as fig. 13; consequently every quadrangle, or quadrilateral, which is not a parallelogram, is a trapezium.

35. A trapezoid has only one pair of its sides parallel, as fig. 14.

36. A diagonal is a right line drawn between any two angles that are opposite in a polygon, as IK, fig. 15. In parallelograms the diagonal is sometimes called the diameter, because it passes through the centre of the figure.

37. Complements of a parallelogram. If any point, as E (fig. 15), be taken in the diagonal of a parallelogram, and through that point two lines are drawn parallel to the sides, as AB, CD, it will be divided into four parallelograms, D, D, L, F, G, G. The two divisions, L, F, through which the diameter does not pass, are called the complements.

38. Base of a figure, is the side on which it is supposed to stand erect, as AD and CD, fig. 16.

39. Altitude of a figure is its perpendicular height from the base to the highest part, as EF, fig. 16.

40. Area of a plane figure, or other surface, means the quantity of space contained within its boundaries, expressed

opening of the compass when a circle is described; and consequently all the radii of a circle must be equal to each other.

45 A diameter of a circle is a straight line drawn from one side of the circumference to the other through the centre, as CB (fig. 18). Every diameter divides the circle into two equal parts.

46. A segment of a circle is a part of a circle cut off by a straight line drawn across it. This straight line is called the chord. A segment may be either equal to, greater, or less than, a semicircle, which is a segment formed by the diameter of the circle, as CEB, and is equal to half the circle.

47. A tangent is a straight line drawn so as just to touch a circle without cutting it, as GH (fig. 18.) The point A, where it touches the circle, is called the point of contact. And a tangent cannot touch a circle in more points than one.

48. A sector of a circle is a space comprehended between two radii and an arc, as IK, fig. 19.

49. The circumference of every circle, whether great or small, is supposed to be divided into 360 equal parts, called degrees; and every degree into 60 parts, called minutes; and every minute into 60 seconds. To measure the inclination of lines to each other, or angles, a circle is described round the angular point as a centre, as IK, fig. 19; and according to the number of degrees, minutes, and seconds, cut off by the sides of the angle, so many degrees, minutes, and seconds, it is said to contain. Degrees are marked by °, minutes by ′, and seconds by ″; thus an angle of 48 degrees, 15 minutes, and 7 seconds is written in this manner, 48° 15′ 7″.

59. A solid is any body that has length, breadth, and thickness: a book, for instance, is solid, so is a sheet of paper; for though its thickness is very small, yet

nated in one point, 8, co
the vertex of the pyrami
57. When the figure of t
angle, it is called a tran
when the figure of the b
drilateral, it is called a q
ramid, &c.
5. A pyramid is either
gular, according as the ba
irregular.
59. A pyramid is also r
or it is oblique. It is righ
drawn from the vertex
the base, is perpendicula
and oblique, when this l
fig. 26.
60. A cylinder is a sol
28), generated or formed
of a rectangle about one
posed to be at rest: this
called the axis of the cyl
be conceived to be gene
tion of a circle, in a dir
cular to its surface, and a
itself.
61. A cylinder is either
as the axis is perpendic
or inclined.
62. Every section of
taken at right angles to
cle; and every section
cylinder, but oblique t
ellipsis.
63. A circle being a p
nite number of sides, it
cylinder may be conce
having such a polygon f
64. A cone is a solid (
having a circle for its ba
convex surface, termina
called the vertex, or a
It may be conceived to
the revolution of a righ
about its perpendicular.
65. A line drawn fro
the centre of the base is
cone.

does not appear so
e, that the oblique
ellipsis; they fre-
it will be wider at
, or what is called
hape of an egg. But
any one may con-
ing a cone, and cut-
ly; it will be then
n whatever direc-
gular ellipsis; and
r the cone be right
y in one case in the
is when the section
r direction, which
o its base.
n is made parallel
he cone, as fig. 32,
bounds the section,

is taken parallel
e curve is called an

ch are formed by
fferent directions,
ies, which are of
ronomy, gunnery,
other sciences.
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oint of which is at
m a point within,
.
ived to be formed
le revolve round
nay be illustrated
ling a ball of clay
, a semicircular
he purpose. The
rcle round which
the axis of the

is are called poles.
through the cen-
terminated by the
diameter of the

a sphere is a cir-
ken through the
called a great cir-
ry other is a lesser

phere cut off by a
nt; and when the
e centre, it divides
nal parts, each of
phere.
id (fig. 35), gene-
of a semi-ellipsis
r conjugate axis;
lipsis is the centre

which the ellipsis
axis. If the sphe-
ut the conjugate
s, it is called a pro-

be generated by
volving about the
called an oblong

spheroid is an el-
s perpendicular to
t is generated; in
.
spheroid parallel
ar figures.
means a piece cut
a plane *passed* through it, usually parallel to the base of the solid, as the frustum of a cone, a pyramid, &c.

There are a lower and an upper frustum, according as the piece sooken of does or does not contain the base of the solid.

83. Ratio is the proportion which one magnitude bears to another of the same kind, with respect to quantity, and is usually marked thus, A : B.

Of these the first is called the antecedent, and the second the consequent.

84. The measure or quantity of a ratio is conceived by considering what part of the consequent is the antecedent; consequently it is obtained by dividing the consequent by the antecedent.

85. Three magnitudes or quantities, A, B, C, are said to be proportional, when the ratio of the first to the second is the same as that of the second to the third. Thus, 2, 4, 8, are proportional; because 4 is contained in 8 as many times as 2 is in 4.

86. Four quantities, A, B, C, D, are said to be proportional when the ratio of the first A to the second B is the same as the ratio of the third C to the fourth D. It is usually written A : B :: C : D, or, if expressed in numbers, 2 : 4 :: 8 : 16.

87. Of three proportional quantities, the middle one is said to be a mean proportional between the other two; and the last a third proportional to the first and second.

88. Of four proportional quantities, the last is said to be a fourth proportional to the other three, taken in order.

89. Ratio of equality is that which equal numbers bear to each other.

90. Inverse ratio is when the antecedent is made the consequent, and the consequent the antecedent. Thus if 1 : 2 :: 3 : 6; then inversely, 2 : 1 :: 6 : 3.

91. Alternate proportion is when antecedent is compared with antecedent, and consequent with consequent. This if 2 : 1 :: 6 : 3; then by alternation 2 : 6 :: 1 : 3.

92. Proportion by composition is when the antecedent and consequent, taken as one quantity, are compared either with the consequent or with the antecedent. Thus, if 2 : 1 :: 6 : 3, then by composition, 2+1 : 1 :: 6+3 : 3; and 2+1 : 2 : 6+3 : 6.

93. Divided proportion is when the difference of the antecedent and consequent is compared either with the consequent or with the antecedent. Thus, if 3 : 1 :: 12 : 4; then by division, 3 — 1 : 1 :: 12 — 4 : 4, and 3 — 1 : 3 :: 12 — 4 : 12.

94. Continued proportion is when the first is to the second as the second to the third, as the third to the fourth; as the fourth to the fifth; and so on.

95. Compound ratio is formed by the *multiplication* of several antecedents and

98. *Inscribe*, to draw one figure within another, so that all angles of the inner figure touch either the angles, sides, or planes, of the external figure.

99. *Circumscribe*, to draw a figure round another, so that either the angles, sides, or planes of the circumscribed figure, touch all the angles of the figure within it.

100. Rectangle under any two lines, means a rectangle which has two of its sides equal to one of the lines, and two of them equal to the other. Also the rectangle under AB, CD, means AB × CD.

101. Scales of equal parts. A scale of equal parts is only a straight line, divided into any number of equal parts at pleasure. Each part may represent any measure you please, as an inch, a foot, a yard, &c. One of these is generally subdivided into parts of the next denomination, or into tenths or hundredths. Scales may be constructed in a variety of ways. They are usually drawn upon ivory or boxwood. See *Instruments*.

102. An axiom is a manifest truth, not requiring any demonstration.

103. Postulates are things required to be granted true, before we proceed to demonstrate a proposition.

104. A proposition is when something is either proposed to be done, or to be demonstrated, and is either a problem or a theorem.

105. A problem is when something is proposed to be done, as some figure to be drawn.

106. A theorem is when something is proposed to be demonstrated or proved.

107. A lemma is when a premise is demonstrated, in order to render the thing in hand the more easy.

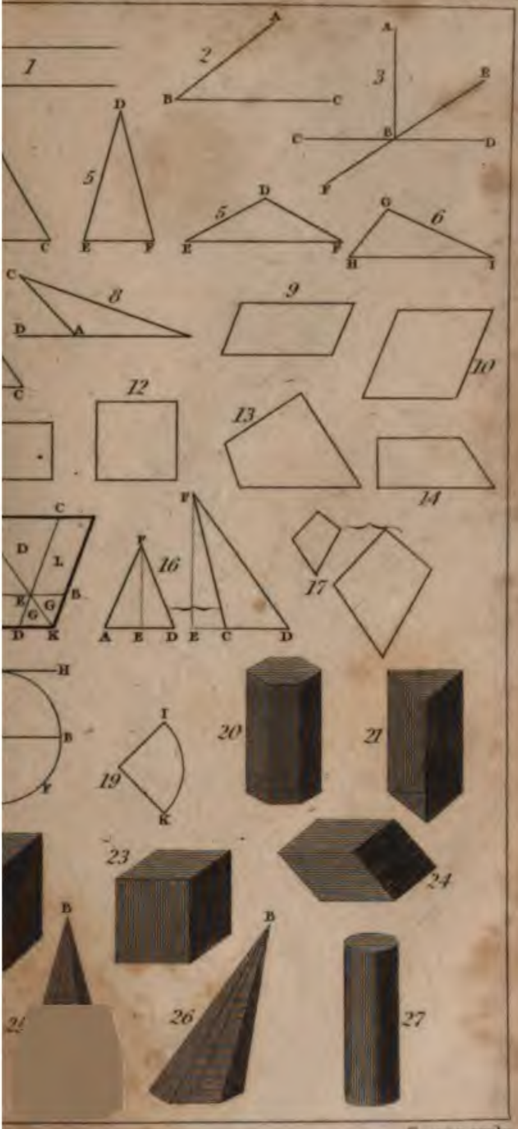
108. A corollary is an inference drawn from the demonstration of some proposition.

109. A scholium is when some remark or observation is made upon something mentioned before.

Case 2. When the
the end of the line.
above the line, and
tance, d C, describe
AB in e and C. Thr
the point e, draw t
the arc e C f in f. T
C, draw the line f C
perpendicular requi
Prob. 3. From a g
a perpendicular up
From the point f,
scribe the arc d e, c
From the points e d,
other radius, descr
each other in g. Th
g, draw the line f g,
perpendicular requ
Prob. 4. To mak
another angle which
From the point B,
scribe the arc ab,
B b, in the points a
D e, and from the p
radius as before, de
ting De in e. Take
apply it to the arc e
through the points
and the angle e D f
gle b B a, as was re
Prob. 5. To divide
into two equal angl
From the point B
scribe the arc AC.
the same, or any o
arcs cutting each
line B d, and it will
as was required.
Prob. 6. To lay d
number of degrees.
There are variou
One is by the use o
a protractor, with
having its circumfe
grees. Let A B be
be required to d
point A, a line ma

GEOMETRY.

Plate I.



Cooper sculp.

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Through a given point C, to
e parallel to a given line AB.
Take any point d, in AB; upon
with the distance C d, describe
e C, and d f, cutting the line AB
d. Make d f equal to e C;
and f draw C f, and it will be
equired.

When the parallel is to be at a
ance from AB. From any two
and d, in the line AB, with a ra-
l to the given distance, describe
and f: draw the line CB to touch
s without cutting them, and it
arallel to AB, as was required.

. To divide a given line AB,
proposed number of equal

A one end of the line, draw A c
ny angle with AB; and from B,
end, draw Bd, making the angle
qual to BA c. In each of these
c, B d, beginning at A and B, set
ny equal parts of any length as
be divided into. Join the points
57, and AB will be divided as re-

9. To find the centre of a given
r of any one already described.
ny chord, AB, and bisect it with
pendicular CD. Bisect CD with
ameter EF, and the intersec-
will be the centre required.

10. To draw a tangent to a given
hat shall pass through a given point

the centre O, draw the radius O
rough the point A draw DE per-
ular to OA, and it will be the tan-
quired.

. 11. To draw a tangent to a circle,
segment of a circle ABC, through
point D, without making use of
tre of the circle.
any two equal divisions upon the
rom the given point B, towards d
and draw the chord e B. Upon B,
ntre, with the distance B d, describe
e f d g, cutting the chord e B in f.
d g equal to d f; through g draw gB,
will be the tangent required.

. 12. Given three points, A, B, C,
a straight line, to describe a circle
all pass through them.
ct the lines AB, BC, by the perpen-
rs a d, b d, meeting at d. Upon d,
e distance d A, d B, describe ABC,
will be the required circle.

. 13. To describe the segment of a
o any length AB, and height CD.
t AB by the perpendicular D g, cut-
B in c. From c make c D on the
dicular equal to CD. Draw AD,
ect it by a perpendicular e f, cutting
g. Upon g the centre, describe
and it will be the required seg-

14. In any given triangle to inscribe

any two angles, A and C, with
s AD and DC. From D the point
ection, let fall the perpendicular
will be the radius of the circle re-

15. In a given square, to describe
r octagon.
the diagonals AC *and BD, inter-*
at e. *Upon the points A, B, C, D,* as centres, with a radius e C, describe the arcs k e n, m e g, f e i, &c. Join f n, m b, k i, l g, and it will be the required octagon.

Prob. 16. In a given circle, to describe any regular polygon.

Divide the circumference into as many parts as there are sides in the polygon to be drawn, and join the points of division.

Prob. 17. Upon a given line AB, to construct an equilateral triangle.

Upon the points A, and B, with a radius equal to AB, describe arches cutting each other at C. Draw AC and BC, and ABC will be the triangle required.

Prob. 18. To make a trapezium equal and similar to a given trapezium ABCD.

Divide the given trapezium ABCD into two triangles by the diagonal DB. Make EF equal to AB; upon EF construct the triangle EFH, whose sides shall be respectively equal to those of the triangle ABD by the last problem. Upon HF, which is equal to *D*B, construct the triangle HFG, whose sides are respectively equal to DBC; then EFGH will be the trapezium required.

By the help of this problem any plan may be copied; as every figure, however irregular, may be divided into triangles. Upon this the practice of land-surveying and making plans of estates, is founded.

Prob. 19. To make a square equal to two given squares. Make the sides DE and DF of the two given squares A and B, form the sides of a right-angled triangle FDE; draw the hypothenuse FE; on it describe the square EFGH, and it will be the square required.

Prob. 20. Between two given lines, AB and CD, to find a mean proportional.

Draw the right line EG, in which make EF equal to AB, and FG equal to CD. Bisect EG in H, and with HE or HG, as radius, describe the semicircle EIG. From F draw F f perpendicular to EG, cutting the circle in I; and IF will be the mean proportional required.

GEOMETRY, *application of algebra to.* When a geometrical problem is proposed to be resolved by algebra, you are, in the first place, to describe a figure that shall represent, or exhibit, the several parts or conditions thereof, and look upon that figure as the true one; then, having considered attentively the nature of the problem, you are next to prepare the figure for a solution (if need be) by producing and drawing such lines therein as appear most conducive to that end. This done, let the unknown line or lines which you think will be the easiest found (whether required or not), together with the known ones (or as many of them as are requisite), be denoted by proper symbols; then proceed to the operation, by observing the relation that the several parts of the figure have to each other; in order to which a competent knowledge of the elements of geometry is absolutely necessary.

As no general rule can be given for the drawing of lines, and electing the most proper quantities to substitute for, so as to always bring out the most simple conclusions (because different problems require *different* methods of solution); the best *way, therefore,* to gain experience in this *matter,* is to attempt the solution of the stitute for, let those be chosen (whether required or not) which lie nearest the known, or given parts of the figure, and by help whereof the next adjacent parts may be expressed, without the intervention of surds, by addition and subtraction only. Thus, if the problem were to find the perpendicular of a plane triangle, from the three sides given, it will be much better to substitute for one of the segments of the base than for the perpendicular, though the quantity required; because the whole base being given, the other segment will be given, or expressed by subtraction only, and so the final equation comes out a single one; from whence the

relation.

4. If the area,
figure be given, o
have but a remot
quired, it will so
sume another figu
one, whereof one
other known qua
other parts of t
proportions of t
parts, may be fou
tained.

These are the
tions, which we s
lustrate by exam

PROB. I.—*The base* (b) *and the sum of the hypot*
cular (a) *of a right-angled triangle* ABC, *being*
perpendicular. See fig. 36.

Let the perpendicular BC be denoted by x; then the hyp
pressed by $a - x$; but (by Euc. 47. 1,) $AB^2 + BC^2 = AC^2$; t

$2ax + xx$; whence $x = \frac{a^2 - b^2}{2a}$ = the perpendicular requ

PROB. II.—*The diagonal, and the perimeter of a re*
ing given; to find the sides. See fig.

Put the diagonal $BD = a$, half the perimeter $(DA + AB) =$
will $AD = b - x$; and therefore, $AB^2 + AD^2$ being $= BD^2$,

$+ x^2 = b$; which, solved, gives $x = \frac{\sqrt{2a^2 - b^2} + b}{2}$.

PROB. III.—*The area of a right-angled triangle*
a rectangle EBDF *inscribed therein being given*

to the three sides thereof: from thence to dete *the sides.*
g. 39.

es be drawn from P to the three angles of the triangle; he per-
lar to AB: call PF, a; PG, b; PH, c; and AD $= x$: then AB) =
CD $(= \sqrt{AC^2 - AD^2}) = \sqrt{3xx} = x\sqrt{3}$; and consequen f the
angle ABC (= CD × AD) $= xx\sqrt{3}$. But this triangle i
angles APB, BPC, and APC; whereof the respective are
efore we have $xx\sqrt{3} = ax + bx + cx$; and from thei
c.

V.—*Having the area of a rectangle* DEFG. *inscri*
gle ABC: *to determine the sides of the r*

be perpendicular to AB, cutting DG in H, and
d the given area $= cc$; then it will be, as $b : x ::$
m CI, leaves $a - \frac{ax}{b} =$ IH; and this, multiplied x,
area of the rectangle; whence we have $abx - ax^2 = bcc$, $x^2 - bx =$
$x - \frac{b}{2} = \pm\sqrt{\frac{bb}{4} - \frac{bcc}{a}}$, and $x = \frac{b}{2} \pm \sqrt{\frac{bb}{4} - \frac{bcc}{a}}$.

VI.—*Through a given point* P, *within a given circle, so to draw*
t line, that the two parts thereof, PR, PQ, *intercepted by that*
and the circumference of the circle, may have a given difference.
g. 41.

diameter APB be drawn; and let AP and BP, the two parts thereof (which
sed given) be denoted by a and b; making PR $= x$, and PQ $= x + d$ (d
given difference.) Then, by the nature of the circle, PQ × PR being =
, we have $\overline{x + d} \times x = ab$, or $xx + dx = ab$; whence x is found =
$\frac{1}{4}dd - \frac{1}{2}d$.

VII.—*From a given point* P, *without a given circle, so to draw*
ht line PQ, *that the part thereof* RQ, *intercepted by the circle,*
be to the external part PR, *in a given ratio.* See fig. 42.

gh the centre O, draw PAB; put PA $= a$, PB $= b$, PR $= x$, and let the
io of PR to RQ be that of m to n; then it will be, as $m : n :: x : \frac{nx}{m} =$
efore PQ $= x + \frac{nx}{m}$: but PR × PQ = PA × PB, or $x \times \overline{x + \frac{nx}{m}} = ab$;
$mx^2 + nx^2 = mab$, and $x = \sqrt{\frac{mab}{m+n}}$.

VIII.—*The sum of the two sides of an isosceles triangle* ABC,
equal to the sum of the base and perpendicular, and the area of
iangle being given: to determine the sides. See fig. 43.

semi-base AD $= x$, the perpendicular CD $= y$, and the given area ABC

$$\sqrt{\frac{3aa}{4}+\frac{4aa}{3}} = \sqrt{\frac{25aa}{12}} = \frac{5}{2}a\sqrt{\frac{1}{3}} = \frac{5}{6}a\sqrt{3}.$$

Prob. IX.—*The segments of the base* AD *and* BD, *sides* AC *and* BC *of any plane triangle* ABC *being sides.* See fig. 44.

Put AD $= a$, BD $= b$, AC $= x$; and let the given ratio of n, so shall BC $= \frac{nx}{m}$. But AC^2 − AD^2 (= DC^2) = BC

species, $x^2 - a^2 = \frac{nnxx}{mm} - b^2$. Hence we have m^2x^2 −

and $x = m\sqrt{\frac{aa-bb}{mm-nn}}$.

GEOMETRY, *usefulness of.* The usefulness of this science extends to almost every art and science. By its help astronomers turn their observations to advantage, regulate the duration of times, seasons, years, cycles, and epochas; and measure the distance, motions, and magnitudes of the heavenly bodies. By it geographers determine the figure and magnitude of the earth, and delineate the extent and bearings of kingdoms, provinces, harbours, &c. It is from this science too that architects derive their just measures in the construction of edifices. It is by the assistance of geometry that engineers conduct all their works, take the situation and plans of towns, the distances of places, and the measure of such things

racter: calyx five
petalled, regular;
glands, fastened to
filaments; fruit
beaks simple, nak
bearded. There a

GERARDIA, in
didynamia angiosp
Natural order of
rix, Jussieu. Esse
five-cleft; corolla
three-parted, the
middle segments
celled, gaping. T

GERMEN. See

GERMINATION
historians have p
plete induction

ry to the germination of seeds; it want of air that seeds which are at a very great depth in the earth, thrive but indifferently, or do not all. They frequently preserve, er, their germinating virtues for years within the bowels of the and it is not unusual, upon a piece and being newly dug to a considepth, to observe it soon after co- with several plants which had not een there in the memory of man. s supposed to be injurious to the , which affords a reason for cover- ds with the soil in which they are , and for carrying on the business ting in darkened apartments; being nothing more than germi- conducted with a particular view.

OPOGON, in botany, a genus of genesia polygamia æqualis class der. Natural order of compositæ sculosæ, or compound flowers, emi-florets or ligulate florets only. simple; receptacle with bristle d chaffs; seeds of the disk, with a red down of the ray, with five awns. are three species.

UND. See *Grammar.*

NERIA, in botany, a genus of the amia angiospermia class and order. al order of personatæ. Calyx five- itting on the germ; corolla incurv- d recurved; capsule inferior; two- There are 12 species.

HYLLIS, in botany, a genus of andria monogynia class and order. l order of spathaceæ. Narcissi, Jus- Calyx none; corolla six-parted; club-shaped, radicle, one-celled. are four species.

M, in botany, English *avens* or *herb* a genus of the icosandria polygynia nd order. Natural order of senti- Essential calyx ten-cleft; petals seeds with a kneed awn. There are species, natives of Europe and America. The roots of the *rivale* stomachic virtues.

NIA, in botany, a genus of the di- monogynia class and order. Natural order of personatæ. Essential cha- : Calyx five-toothed, teeth acumi- corolla two-lipped; stamina, four, th two barren anthers at the end of the ter filaments; pericarpium a drupe ntaining a four or five celled nut, with a ed in each cell. There are two species.

GIANT's *causeway*, a vast collection of black kind of marle, called basaltes, in e county of Antrim, in Ireland. See *Basaltes.*

GIBBOUS, in astronomy, a term used reference to the enlightened parts of e moon, whilst she is moving from the rst quarter to the full, and from the full the last quarter.

GIFT, in law, a transferring the property in a thing from one to another without a luable consideration; for to trans- thing upon a valuable consideracontract or sale. By the common chattels, real or personal, may be or given without deed, except in ecial cases, and a free gift is good a consideration, if not to defraud rs. But no leases, estates, *or in-* either *of freehold or term of years,* on any uncertain interest, not being copyhold or customary interest of, in, to, or out of any messuages, manors, lands, tenements, or here s, shall at any time be assigned, d, or surrendered, unless it ed or note in writing, signed by so assigning, granting, or surre the same, or their agents ther wfully authorized by writing, o and operation of law, 29 Car. II A gift of any thing, without a c ation, is good, but it is revocable delivery to the donee, of the thing

GILBERTIA, in ny, a genus of the decandria monogy class and order. Calyx five-toothed corolla deeply five-parted; nectary d eply ten-parted, with lanceolate segment antheræ sessile, in the segments of t tary; fruit six-celled. Only one , Gilbertia racemosa, found in P ranches reddish a le ernate, elliptic, a downy under- n

e art of laying a f gold on wood, a nces. The materials for er the different states in w ld is used for the purpose, are the following: leaf-gold of different thicknesses, and formed either of the pure metal, or of an alloy of this with silver, amalgam of gold, and gold-powder. The leaf-gold is procured by the gilder from the gold beater. See *Gold.* But the other two substances being prepared by the gilder himself, may be with propriety described here. The amalgam of gold is made by heating in a crucible some pure quicksilver; and when it is nearly boiling, adding to it about a sixth of its weight of fine gold in thin plates, heated red hot; the mixture, after being kept hot for a few minutes, becomes of a perfectly homogeneous consistence, and may then be allowed to cool; when cold, it is to be put in a piece of soft leather, and by gradual pressure, the fluid part of the amalgam, consisting almost wholly of mercury, may be forced through the pores of the leather, while the gold combined with about twice its weight of mercury will remain behind, forming a yellowish silvery mass of about the consistency of soft butter. This, after being bruised in a mortar, or shaken in a strong phial, with repeated portions of salt and water, till the water ceases to be fouled by it, is fit for use, and may be kept for any length of time without injury in a corked phial. It is of essential importance that the materials of this amalgam, and especially the mercury, should be perfectly pure, as the least portion of lead or bismuth would very materially injure the beauty of the gilding. No mercury ought to be employed that has not been procured by distillation from the red precipitate (nitrous red oxide of mercury) either alone or mixed with a little charcoal powder.

Gold is prepared in three different ways. The first and simplest is to put into a glass or earthen mortar some gold-leaf, with a little honey or thick gum water, and grind the mixture for a considerable time, till the gold is reduced to extremely earthen vessel, and continuing the fire till the whole of the mercury is evaporated, taking care that the amalgam shall be constantly stirred with a piece of glass rod, or tobacco-pipe, in order to prevent the particles of gold from adhering as the mercury flies off. When the mercury is completely evaporated, the residual gold being then ground in a Wedgewood-ware mortar, with a little water, and afterwards dried, it is fit for use.

Gilding is performed either with or without heat. By the first of these methods those substances are gilt which are not liable to alteration by exposure to a moderate heat, such as metals, and sometimes glass and porcelain: the second method is practised with those substances, such as wood, paper, lead, silk, lacquered and japanned ware, &c. which would be injured and even destroyed at the temperature requisite for gilding the former. The last of these methods being the simplest, shall be first described, and we shall begin with the art of gilding on wood.

There are two methods for gilding on wood, namely, oil gilding and burnished gilding. Oil gilding is thus performed: the wood must first be covered or primed with two or three coatings of boiled linseed oil and white-lead, in order to fill up the pores and to conceal the irregularities of the surface, occasioned by the veins in the wood. When the priming is quite dry, a thin coat of gold size must be laid on. This is prepared by grinding together some strongly calcined red ochre with the thickest drying oil that can be procured, and the older the better: that it may work freely, it is to be mixed, previously to being used, with a little oil of turpentine till it is brought to a proper consistence. If the gold size is good it will be sufficiently dry in twelve hours, more or less, to allow the artist to proceed to the last part of the process, which

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while this last is yet mo
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Letters written on ve
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brass wire bound together into a tuft; by it the surface is rendered perfectly smooth and bright: but it still remains of a pale yellowish colour: this defect is next removed by warming the piece, and smearing it over with gilders' wax, a composition of bees' wax, red ochre, verdigris, and green vitriol or alum. The wax being burnt off over a charcoal fire, and the piece quenched in urine, the colour of the gilding will be found to be much heightened; if it is not sufficiently so, the application of a succeeding one will complete the desired effect, after which the work may be burnished or not, according to the taste of the artist. Instead of the common gilders'-wax, a mixture of equal parts of nitre, sal-ammoniac, green vitriol, and verdigris, moistened with water, will answer the purpose.

Copper, and the alloys formed by its combination with zinc, are gilded nearly in the same manner as silver; but, as their affinity for mercury is considerably less than that of silver, advantage is taken of the action of nitric acid to facilitate the adhesion of the copper and mercury. A piece of copper, if cleaned, by steeping it in acid, and subsequent washing, and is then burnished either in a lathe, or by any other means: after this it is dipped in a neutralized solution of nitrate of mercury, and in the space of a few minutes, the mercurial salt is decomposed, the copper takes the place of the mercury, and at the same time the mercury is deposited in the metallic state on the surface of the copper, covering it entirely, and strongly adhering to it; the gold amalgam is now applied, and the rest of the process goes on as already described. By this method of proceeding, a quantity of five grains of gold will completely gild earthen vessel, and continuing the fire till the whole of the mercury is evaporated, taking care that the amalgam shall be constantly stirred with a piece of glass rod, or tobacco-pipe, in order to prevent the particles of gold from adhering as the mercury flies off. When the mercury is completely evaporated, the residual gold being then ground in a Wedgewood-ware mortar, with a little water, and afterwards dried, it is fit for use.

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posed of size and bole
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the cotton ball, and be
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tine.

Letters written on
gilded in three ways
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ters are written as u
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duced by breathing
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Drinking glasses a
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ld soon wears off : on this ac-
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recourse to.

purpose some gold powder is
with borax, and in this state
o the clean surface of the glass.
on camels' hair pencil; when
the glass is put in a stove heat-
ut the temperature of an an-
en, the gum burns off, and the
vitrifying cements the gold with
ness to the glass; after which it
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is in like manner fixed by fire
; and this kind of ware being
nsparent nor liable to soften,
njure its form in a low red heat,
m the risk and injury, which
nd more fusible kinds of glass
sustain from such treatment.

ing upon metals, the gold is
nto immediate contact with the
al, and they both remain firmly
erely by the attraction of adhe-
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ll the kinds of gilding on metal,
y of adhesion, is one which is
s practised on plane surfaces of
nd iron, with considerable suc-
e metal being previously polish-
ted to about the temperature of
ead, and covered with a double
gold leaf: by the cautious ap-
of a blood stone burnisher ap-
ntly at first, and increasing the
he pressure by degrees, the sur-
e gold and copper are brought to
ch other in almost every point,
adhere with a force proportion-
e completeness of the contact.
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nner, and sometimes a third, if
ng is intended to be very solid.
ction to this kind of gilding is its
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gold successively burnished
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ronger compression which takes
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etal become so perfectly united as
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most usual method of covering the
metal with gold, is by means of
am, or, as it is technically called,
lding. If the metal to be gilt is
he best method of proceeding is
soak it in warm dilute muriatic
at the surface may be rendered
y clean; it must then be washed
n water, changed two or three
o get rid of the whole of the acid:
fterwards dried, and made mode-
arm, a little gold amalgam, also
s to be carefully and evenly
pon the silver, to which it will
ately adhere: when this is com-
he piece is placed upon a *con-*
support over a charcoal fire, and while the mercury is evaporating, if any specks or places appear, which have escaped the amalgam, a small piece is to be laid on, and spread with a brush, to supply the deficiency, without removing the article from the fire. After a time, the whole of the mercury will be driven off, and the piece, after cooling, being accurately examined, will be found to be entirely covered with a thin coating of pale dull gold. The small roughnesses, and loosely adhering particles, are now to be removed with a scratch-brush, which is made of some extraordinary fine brass wire bound together into a tuft; by it the surface is rendered perfectly smooth and bright: but it still remains of a pale yellowish colour: this defect is next removed by warming the piece, and smearing it over with gilders' wax, a composition of bees' wax, red ochre, verdigris, and green vitriol or alum. The wax being burnt off over a charcoal fire, and the piece quenched in urine, the colour of the gilding will be found to be much heightened; if it is not sufficiently so, the application of a succeeding one will complete the desired effect, after which the work may be burnished or not, according to the taste of the artist. Instead of the common gilders'-wax, a mixture of equal parts of nitre, sal-ammoniac, green vitriol, and verdigris, moistened with water, will answer the purpose.

Copper, and the alloys formed by its combination with zinc, are gilded nearly in the same manner as silver; but, as their affinity for mercury is considerably less than that of silver, advantage is taken of the action of nitric acid to facilitate the adhesion of the copper and mercury. A piece of copper, if cleaned, by steeping it in acid, and subsequent washing, and is then burnished either in a lathe, or by any other means: after this it is dipped in a neutralized solution of nitrate of mercury, and in the space of a few minutes, the mercurial salt is decomposed, the copper takes the place of the mercury, and at the same time the mercury is deposited in the metallic state on the surface of the copper, covering it entirely, and strongly adhering to it; the gold amalgam is now applied, and the rest of the process goes on as already described. By this method of proceeding, a quantity of five grains of gold will completely gild both the upper and under surfaces of one-hundred and forty-four copper buttons each of them an inch in diameter.

There is no metal, the gilding of which presents so many difficulties as iron, or rather steel. If the method of simple burnishing down is had recourse to, the heat requisite for this purpose will, in many cases, bring the temper of the steel too low: on such occasions, the way already described for gilding on copper, is sometimes practised: that is, the parts of the steel to be gilded, are pencilled over with nitrate of mercury, by which they are covered with a slightly-adhering coat of mercury; then the amalgam is applied, and the gilding finished in the usual way. The objections to this mode of proceeding are, *first, that* a considerable heat is required, though inferior to that requisite for vantages over the others. It depends upon the fact, that if sulphuric ether and nitro-muriate of gold are mixed together, the ether will, by degrees, separate from the acid nearly the whole of the gold, and retain it for some time in solution, in nearly a metallic state. If ether, thus charged with gold, is spread by means of a pen or fine brush, on the surface of highly polished steel, the ether presently evaporates, leaving the gold behind in close contact with the steel, and the adhesion is considerably improved by the subsequent application of the burnisher. The best oil of turpentine may be used instead of ether, having nearly the same efficacy in decomposing the nitro-muriate of gold.

Gold-gilding upon silver is performed in the following manner: a saturated solution of gold, in nitro-muriatic acid, is poured upon some linen rags, which when dry, are heaped in a plate, and burned to a heavy black ash. A soft cork, being moistened in water, is dipped in this ash, and then rubbed on the surface of polished silver, upon which the minute particles of gold become fixed, and cover it with an extremely thin coating, which, when burnished, exhibits the genuine colour and lustre of the precious metal.

GILL, a measure of capacity, containing a quarter of a pint.

GILT *varnish*. See *Varnish*.

GIMBALS, in sea affairs, the brass rings by which a sea compass is suspended in its box, so as to counteract the effect of the ship's motion, and keep the card horizontal.

GIMBLETING, a term applied to the anchor to denote the action of turning it round by the stock, so that the motion of the stock appears similar to that of the handle of a gimblet when it is employed.

GIN. See *Geneva*.

GIN, in mechanics, a machine for driving piles, fitted with a windlass and win-

and their ends sh
loam.

GIRRONE', or GIR
ry, a coat of arms divi
triangular figures, mee
of the shield, and alter
metal.

GIRT, in the meas
the circumference of a
use this word for the
circumference only, un
made of it. The squar
is considered as equal
section of the tree, wh
fore multiplied by the l
accounted the solid co

GIRT, in naval affair
a ship which is moored
bles as to be prevente
change of the wind or t
of which her head wo
directed.

GIRTH *line*, a rope
single block on the h
masts to hoist up the ri
sons employed to plac
cross-trees on the mast

GISEKIA, in botan
pentandria pentagynia
Natural order of succul
leaved; corolla none;
proximating, roundish,
is but one species, th
annual plant, and a
Indies.

GIVEN, among m
philosophers, the same

GLABRARIA, in b
the polyadelphia polya
der. Calyx five-cleft;
tary composed of bristl
calyx; stamens thirty,
pericarpium a drupe.
species, viz. G. tersa,
not being liable to ro
by insects, it is much
in the East Indies.

itself by an insensible di-
e space of ten fathoms.
RS, persons who fought
nd other weapons for the
the public in the arenas of
in the city of Rome, and at
nder the dominion of the

S, in botany, English *corn-*
of the triandria monogynia
r. Natural order of ensatæ.
. Corolla six-parted, ir-
al; stigmas, three; there

ee *Camelus.*
n mineralogy, an ore of
hite; massive in various
ystallized in cubes and
he surface of the crystals is
plendent; it is brittle, and
avity 6.45.
anatomy, a small body,
interweaving of vessels of
overed with a membrane,
ed with an excretory duct.

. See *Horse.*
See *Anatomy.*
, the *pratincole*, a genus of
order grallæ, bill strong,
ooked at the end; nostrils
ear and oblique; feet four-
ng, slender, connected at
membrane; tail forked,
welve feathers. There are
of which the principal is P.
ich is about as large as a
lives on water insects and

ompound of the fixed al-
aline earths with silica,
omplete fusion, and then
gealed. Silica, when mix-
ed alkalies, and exposed
t, readily enters into fusi-
tate the mixture may be
any shape, and if sudden-
w the temperature at which
solid state, it retains the
and those peculiar proper-
ng to the substance called
c oxides are sometimes
to assist in the fusion, as to
certain colours to the mass.
lass be suffered to cool very
ferent tendency of the con-
to assume solid forms at
ratures, will cause them to
essively in crystals, as salts
tion in water assume the
als as the liquid is slowly
But if the glass be suddenly
to the point of congelation,
s have not time to separate
, and the glass remains the
eneous compound as while
sion.
everal kinds of glass adapt-
t uses. The best and most
the flint and the plate glass.
well made, are perfectly
nd colourless, heavy and
ey are composed of fixed
liceous sand, calcined flints,
in different proportions.
s contains a large quantity
ad, which by certain pro-
lly separated. The *plate*

glass is poured in the melted state upon a table covered with copper, and iron ledges to confine it; and as it cools a metal roller is passed over it to reduce it to an uniform thickness. It is cast half an inch thick or more, and afterwards ground to a proper degree of thinness, and polished.

Crown-glass, that used for windows, is made without lead, chiefly of fixed alkali fused with siliceous sand, to which is added some black oxide of manganese.

Bottle glass is the coarsest and cheapest kind; into this little or no fixed alkali enters the composition. It consists of an alkaline earth combined with alumina and silica. In this country it is composed of sand and the refuse of the soap-boiler, which consists of the lime employed in rendering his alkali caustic, and of the earthy matters with which the alkali was contaminated. The most fusible is flint-glass, and the least fusible is bottle-glass.

Flint-glass melts at the temperature of 10 degrees Wedgewood; crown-glass at 30 degrees; and bottle-glass at 47 degrees. The specific gravity varies between 2.48 and 3.33.

Good glass is perfectly transparent, and when cold very brittle, but at a red heat it is one of the most ductile bodies known, and may be drawn into threads so very delicate as to become almost invisible to the human eye. It is extremely elastic, and one of the most sonorous of bodies.

Few chemical agents have any action upon it. It has been decomposed by means of the Voltaic battery, being, however, first reduced to powder. Fluoric acid solves it very quickly by heat. The continued action of hot water is said to be capable of decomposing glass.

In making glass, the materials are completely fused together, and in this state the hot mixture is called frit. The frit is introduced into large pots made of prepared clay, and exposed to a heat sufficient to melt it completely. When the fusion has continued the proper time, the furnace is allowed to cool a little. In this state the glass is exceedingly ductile, and will assume any shape according to the fancy of the workman. The vessels thus formed must not be permitted to cool too quickly, hence they are put into a hot furnace, in order that the heat may pass off very gradually; this is called annealing.

Glass may be tinged of various colours, by mixing with it, while in fusion, some one of the metallic oxides. Thus blue glass is formed by the oxide of cobalt; green by the oxide of iron or copper; violet by the oxide of manganese; red by a mixture of the oxides of copper and iron; purple by the oxide of gold; white by the oxide of arsenic and zinc; and yellow by the oxide of silver and by combustible bodies.

We shall give now a detail of the manual operations in the manufacture of glass.

Glass-blowing.—The operation is exceedingly simple; the workman has a tube of iron, the end of which he dips into a pot of melted glass, and thus gathers a small quantity of glass on the end of it, he then applies the other end of the many holes or mouths are made as there are workman to make use of the furnace, and before each mouth a pot of melted glass is placed; the pots are very large like crucibles, and will hold from three to four hundred weight of liquid glass, they are supported upon three small piers of brickwork, resting on the floor of the furnace. The form reverberates the flame from the roof down upon the pots, and they are placed at some distance within the furnace, that the flame may get between the wall and the pots. The upper dome is built upon the other, and its floor made flat by filling up round the roof of the lower dome with brickwork, there is a small chimney opens from the top of the lower dome into the middle of the floor of the upper one, which conveys the smoke away from it, and a flue from the upper dome leads it completely from the furnace.

The upper dome is used for annealing the glass, and is exactly similar to a large oven, it has three mouths, and in different parts a small flight of steps leads up to each.

The principal implements used by the glass blower are, a blowing-pipe, which is an iron pipe about two feet long, with rope-yarn wrapped round where the workman takes hold of it; two or three iron rods of the same length; a pair of blunt shears, and several different sized ladles, shovels, pokers, &c. and two stools.

For explaining the operation, we shall describe the method of making a goblet. The workman dips the end of his blowing-pipe, which is hot, through the hole into the melting pot, and by turning it about, a small quantity of the glass, which is called metal, sticks to the iron: this he repeats three or four times (between each dip rolling it on an iron plate, fixed on a stool, till he has got nto common use till very long after

SS, *painting on*. See *Painting* and
ling.
SS, in sea affairs, the usual appel-
or a telescope. A night-glass is a
pe made for viewing objects at
Half-hour glass, called also the
glass, is used to measure the time
each watch has to stay upon deck.
d quarter-minute glasses are used
tain the rate of the ship's velocity,
ed by the log; these glasses should
uently compared with a good stop-
to determine exactly how many
they run.
UBER'S *salt*, a cathartic and purg-
See *Soda*, *sulphate of*.
UCOPIS, or the *wattle-bird*, in na-
story, a genus of birds of the order
Bill incurvate and arched; lower
le shorter than the upper, and ca-
te beneath the base; nostrils de-
l, half covered with a cartilaginous,
d ciliated at the end; the legs ca-
at the back, feet formed for walk-
t inhabits New Zealand.
UX, in botany, a genus of the
dria monogynia class and order.
l order of calycanthemæ. Salica-
ussieu. Calyx one-leafed, bell-
; corolla none; capsule one-cel-
ve-valved, five-seeded. There is
ne species, *viz*. G. maritima, sea
wort, or black salt wort.
ZING, in the arts, is the crusting
arthen ware. When earthen ware
erly baked, it is dipped into a com-
n called a glaze, made by mixing
er in water, till it becomes as thick
am, fifty-six parts of white lead,
of ground flints, and three of
flint glass. The ware, by being
acquires a strong property of im-
moisture, and in this state, it is
biscuit; when dipped into the
it attracts it into its pores, and the
ecomes presently dry; it is then
d a second time to the fire, by which
the glaze it has imbibed is melted,
thin, glassy coat is formed upon the
e. The colour is more or less yel-
cording as a greater or less propor-
lead has been used. This kind of
g by lead, is liable to be attacked
ds, and of acting in some degree as
on; a substitute has therefore been
mended, which consists of equal
f white glass and soda finely pul-
d, and exposed to a strong heat till
dry. See *Pottery*, and *Stone-ware*.
ANING, in law. It hath been said,
y the common law and custom of
d, the poor are allowed to enter
ean upon another's ground after the
t, without being guilty of trespass;
at this humane provision seems
wed from the Mosaical law; but it
w positively settled, by a solemn
ent of the court of Common Pleas,
right to glean in the harvest field
t be claimed as a general right by
person at common law; nor as a
n by the poor of a parish, legally
l.
EBE, or *Glebe-land*, is a portion of
meadow, or pasture, belonging to,

or parcel of the parsonage or vicarage, over and above the tithes.

GRECHOMA, in botany, English *ground-ivy*, a genus of the didynamia gymnospermia class and order. Natural order of verticillatæ. Labiatæ, Jussieu. Calyx five cleft; each pair of anthers converging in form of a cross. There is but one species, *viz*. G. hederacea, ground-ivy.

GLEDITSIA, in botany, a genus of the polygamia dioecia class and order. Natural order of lomentaceæ, Leguminosæ, Jussieu. Hermaphrodite; calyx four-cleft; corolla four-petalled; stamens six; pistil one, legume. There is only one species, with several varieties.

GLEE, in music, a vocal composition in three or more parts, generally consisting of more than one movement, the subject of which may be either gay, tender or grave; bachanalian, amatory, or pathetic.

GLEET, in medicine, the flux of a thin, limpid humour from the urethra.

GLINUS, in botany, a genus of the dodecandria pentagynia class and order. Natural order of coryophyllei Ficoideæ, Jussieu. Calyx five-leaved; corolla none; nectaries cloven bristles; capsule five-cornered, five-celled, five-valved, containing numerous seeds. There are three species.

GLIRES, in the Linnæan system, the 4th order of mammalia. Fore teeth cutting, two in each jaw; no tusks; feet with claws formed for running and bounding; food, bark and roots of vegetables.

GLOBBA, in botany, a genus of the diandria monogynia class and order. Natural order of scitamineæ. Essential character: calyx superior, trifid; corolla equal, trifid; capsule three-celled; seeds very many. There are four species.

GLOBE, a round or spherical body, more usually called a sphere. See *Sphere*.

GLOBE, an artificial spherical body, on the convex surface of which are represented the countries of our earth; or the face of the heavens, the circles of the sphere, &c. The former is called the terrestrial globe; the latter the celestial globe. These globes are placed in frames, with other appurtenances. Their principal use, besides serving as maps to distinguish the outward parts of the earth, and the situation of the fixed stars, is to illustrate the phenomena arising from the diurnal motion of the earth. The globes commonly used are composed of plaster, on which the map or description is pasted. When finished, they are hung in a brass meridian, with an hour-circle and a quadrant of altitude, and fitted into a wooden horizon.

There are ten principal circles represented upon globes, *viz*. six greater and four lesser ones. The greater circles are the horizon, meridian, and equinoctial, as it is called on the celestial, and equator on the terrestrial globe, the ecliptic drawn along the middle of the zodiac, and the two colures. The lesser circles, of principal use, are the two tropics and two polar circles.

Of these circles some are fixed, and always obtain the same position; others moveable, according to the position of

points of the c
&c. The brazen meridian is a
brass, divided into degrees, *viz*
quadrant into 90 degrees. It divi
globe into two equal parts, called t
ern and western hemispheres. Th
rant of altitude is a thin pliable
brass, answering exactly to a qua
the meridian. It is divided into 9
has a notch, nut, and screw, to fix
brazen meridian in the zenith
place, where it turns round a piv
supplies the room of vertical c
The hour-circle is a flat ring of bras
ded into twenty-four equal parts, o
distances; and on the pole of the
is fixed an index, that turns roun
the globe, and points out the hours
the hour-circle. Lastly, there is gen
added a compass and needle upo
pediment of the frame.
The surface of the celestial globe m
esteemed a just representation of the
cave expanse of the heavens, not
standing its convexity; for it is ea
conceive the eye placed in the cent
the globe and viewing the stars on its
face. The stars are all disposed in
stellations under the forms of various
mals, whose names and figures are re
sented on the celestial globe, which w
first invented by the ancient astronon
and poets, and are still retained for
better distinction of these luminaries.

Problems on the Celestial Globe.

1. "To rectify the globe:" Raise or e
vate the pole to the latitude of the plac
screw the quadrant of altitude in the z
nith; set the index of the hour-circle
the upper XII, and place the globe nor
and south by the compass and needle
then it is a just representation of the he
vens for the given day at noon.
2. "To find the sun's place in the ecli
tic." Find the day of the month in the c
lendar on the horizon, and right again
it is the degree of the

next day after the full: whence, at this time of the year, there is much more moonlight than in the spring; and hence this autumnal full moon came to be called the harvest moon, the hunter's, or shepherd's moon; all which may be clearly shewn on the globe.

13. "To represent the face of the starry firmament for any given hour of the night." Rectify the globe, and turn it about till the index points to the given hour; then will all the upper hemisphere of the globe represent the visible half of the heavens, and all the stars on the globe will be in such situations as exactly correspond to those in the heavens, which may therefore be easily found, as will be shewn in the 16th problem.

14. "To find the hour when any known star will rise, or come upon the meridian." Rectify the globe, and set the index to XII; then turn the globe till the star s to the horizon or meridian, and th x will shew the hour required.

15. "To find at what time of the y given star will be on the meridian at night." Bring the star to the m and observe what degree of the is on the north meridian under th zon; then find in the calendar on rizon the day of the year against t gree, and it will be the day requir

16. "To find any particular star find its altitude in the heavens by drant, and the point of the com bears on, then, the globe being re and the index turned to the give if the quadrant of altitude is fixed zenith and laid towards the point compass on which the star was ob n the star required will be found at the same degree of altitude on the said quadrant, as it was by observation in the heavens

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Problems on the Terrestrial Globe.

1. "To find the latitude of any place." Bring the given place to the brazen meridian, and observe what degree it is under, for that is the latitude required.

2. "To rectify the globe for any given place." Raise the pole so many degrees above the horizon as are equal to the latitude of the place; then, finding the sun's place, bring it to the meridian, and proceed as directed in problem 1. on the celestial globe.

3. "To find the longitude of a given place." Bring the place to the brazen meridian, and observe the degree of the equator under the same, for that expresses the longitude required.

4. "To find any place by the latitude and longitude given."—Bring the given degree of longitude to the meridian, and under the given degree of latitude you will see the place required.

5. "To find all those places which have the same latitude or longitude with those of any given place."—Bring the given place to the meridian; then all those places which lie under the meridian have the same longitude: again, turn the globe round on its axis; then all those places which pass under the same degree of the meridian with any given place have the same latitude *with it.*

6. "*To find all those places where it is* noon at any given hour of the day in any place."—Bring the given place to the meridian, set the index to the given hour; then turn the globe till the said index points to the upper XII, and observe what places lie under the brass meridian; for to them it is noon at that time.

7. "When it is noon at any one place, to find what hour it is at any other given place."—Bring the first given place to the meridian, and set the index to the upper XII; then turn the globe till the other given place comes to the meridian, and the index will point to the hour required.

8. "For any given hour of the day in the place where you are, to find the hour of the day in any other place."—Bring the place where you are to the meridian, set the index to the given hour, then turn the globe about; and when the other place comes to the meridian, the index will shew the hour of the day there as required.

9. "To find the distance between any two places in English miles."—Bring one place to the meridian, over which fix the quadrant of altitude; and then laying it over the other place, count the number of degrees thereon contained between them; which number multiply by 69 and a half (the number of miles in one degree), and the product is the number of English miles required.

10. "To find how any one place bears from another."—Bring one place to the brass meridian, and lay the quadrant of altitude over the other, and it will shew on the horizon the point of the compass on which the latter bears from the former.

11. "To find those places to which the sun is vertical in the torrid zone for any given day."—Find the sun's place in the ecliptic for the given time, and bring it to the meridian, and observe what degree thereof it cuts: then turn the globe about, and all those places, which pass under that degree of the meridian, are those required.

12. "To find what day of the year the sun will be vertical to any given place in the torrid zone."—Bring the given place to the meridian, and mark the degree exactly over it; then turn the globe round, and observe the two points of the ecliptic which pass under that degree of the meridian: lastly, see on the wooden horizon on what days of the year the sun is in those points of the ecliptic; for those are the days required.

13. "To find those places in the north frigid zone, where the sun begins to shine constantly without setting, on any given day between the 21st of March and the 21st of June."—Find the sun's place in the ecliptic for the given day, bring it to the brazen meridian, and observe the degrees of declination; then all those places which are the same number of degrees distant from the pole are the places required to be found.

14. "To find on what day the sun begins to shine constantly without setting, on any given place in the north frigid zone, and how long."—Rectify the globe to the latitude of the place, and, turning it about, observe what point of the ecliptic between Aries and Cancer, and also between Cancer and Libra, coincides with

To find, for any given day and hour, those places wherein the sun is then rising and setting, or on the meridian; also those places which are enlightened, and those which are not."—Find the place to which the sun is vertical at the given time, and bring the same to the meridian, and elevate the pole to the latitude of the place; then all those places which are in the western semicircle of the horizon have the sun rising, and those in the eastern semicircle see it setting; and to those under the meridian; it is noon. Lastly, all places above the horizon are enlightened, and all below it are in darkness or night.

17. "The day and hour of a solar or lunar eclipse being given, to find all those places in which the same will be visible." Find the place to which the sun is vertical at the given instant, and elevate the globe to the latitude of the place; then in most of those places above the horizon will the sun be visible during his eclipse; and all those places below the horizon will see the moon pass through the shadow of the earth in her eclipse.

18. "The length of a degree being given, to find the number of miles in a great circle of the earth, and thence the diameter of the earth."—Admit that one degree contains 69 and an half English statute miles; then multiply 360 (the number of degrees in a great circle) by 69 and an half, and the product will be 25020, the miles which measure the circumference of the earth. If this number be divided by 3.14.16, the quotient will be 7963. $\frac{86}{100}$ miles for the diameter of the earth.

19. "The diameter of the earth being known, to find the surface in square miles, and its solidity in cubic miles."—Admit the diameter to be 7964 miles; then multiply the square of the diameter by 3.1416, and the product will be 199250205 very near, which are the square miles in the surface of the earth. Again, multiply the

ng glue of parings they first
two or three days in water;
ing them well out, they boil
consistence of a thick jelly,
pass, while hot, through osier
separate the impurities from
n let it stand some time to pu-
ser: when all the filth and or-
settled to the bottom of the
y melt and boil it a second
y next pour it into flat frames
whence it is taken out pretty
olid, and cut into square pieces
They afterwards dry it in the
ort of coarse net; and at last
finish its drying. The best
which is oldest; and the sur-
ry its goodness is to lay a piece
ree or four days, and if it swell
ly without melting, and when
resumes its former dryness, it
. A glue that will hold against
r may be made thus: mix a
quick lime with four ounces of
boil them to a good thickness,
it on tin plates in the shade,
become exceedingly hard, but
olved over a fire, as glue, and
he business to admiration.
ethod of preparing and using.
t of water on the fire, then
t half a pound of good glue,
em gently together till the
rely dissolved, and of a due
. When glue is to be used it
nade thoroughly hot; after
a brush dipped in it, besmear
the joints as quick as possible;
ng them together, slide or rub
wise one upon another two or
to settle them close; and so
nd till they are dry and firm.
rchment is made by boiling

jet of water till the water carries off nothing more, but runs off colourless, what remains is gluten: it is ductile and elastic; it has some resemblance to animal tendon or membrane; it is very tenacious, and may be used as a cement for broken porcelain vessels. It has a peculiar smell, with scarcely any taste. When exposed to the air it assumes a brown colour, and becomes apparently covered with a coat of oil. When completely dry it resembles glue, and breaks like glass. It is insoluble in water, alcohol, and ether; but the acids dissolve it, and the alkalies precipitate it. It has a strong affinity for the colouring matter of vegetables, and likewise for resinous substances. When kept moist, it ferments, and emits a very offensive smell; the vapour blackens silver and lead. Its constituent parts are oxygen, hydrogen, carbon, and *azote*. It exists, as we have observed, most abundantly in wheat, but it is found in large quantities in many other plants. It is gluten that renders wheat so fit for forming bread.

GLYCINE, in botany, a genus of the diadelphia decandria class and order. Natural order of papilionaceæ or leguminosæ. Calyx two-lipped, corolla, the keel turning back the banner at the tip. There are 25 species.

GLYCYRRHIZA, or *liquorice*, a genus of the diadelphia decandria class and order. Natural order of papilionaceæ or leguminosæ. Calyx two-lipped, upper lip three-parted, lower undivided; legume ovate, compressed. There are four species. These are tall growing perennial, herbaceous plants, with the stalks somewhat woody at bottom. Stipules are distinct from the petiole; flowers in a head or spike from the axis and at the is permanent, with yellow or white scales.

GNAT. See *Culex.*

GNEISS, in mineralogy, is composed principally of felspar, quartz, and mica, forming plates, laid on each other, and separated by thin layers of mica. It differs from granite by being shistose; though, like that, it sometimes contains shorl and garnet. The beds of gneiss sometimes alternate with layers of granular limestone, shistose, hornblende, and porphyry. It is rich in ores, almost every metal has been found in gneiss rocks, either in veins or beds.

GNETUM, a genus of the monoecia monodelphia class and order. Natural order of piperitæ. Urticæ, Jussieu. Male, an ament with scales; corolla none; filaments one, with two anthers: female, an ament with scales; corolla none; style with a bifid stigma; drupe with one seed. There is only one species, viz. G. gnemon, a native of the East Indies.

GNIDIA, in botany, a genus of the octandria monogynia class and order. Natural order of vepreculæ. Calyx funnel-form, four-cleft; petals four, inserted into the calyx; seed one, somewhat berried. There are 11 species.

GNOMON, in dialling, the stile, pin, or cock of a dial; which, by its shadow, shows the hour of the day. See *Dial.*

GNOMON, in geometry. If, in a parallelogram, the diameter be drawn; also two lines parallel to the sides of the parallelogram, and cutting the diameter in one and the same point, so that the parallelogram is, by these parallels, divided into two parallelograms, through which the diameter does not pass, called complements: those through which the diameters pass are called the parallelograms about the diameter; and a gnomon consists of the two complements, and either of the parallelograms about the diameter.

GNOMON

verse, show that he governs as well as formed it; and the depth of his counsels even in conducting the material universe, of which a great part surpasses our knowledge, keep up an inward veneration and awe of this great Being, and dispose us to receive what may be otherwise revealed to us concerning him.

The Christians were very early divided in opinion as to the nature and essence of the Supreme Being; a great part worshipping three persons in the unity of the godhead, whilst others absolutely rejected a trinity of persons, and asserted the unity of the divine nature, both as to person and substance. With respect to the theology of the Pagans, it is thought by most learned men, that they acknowledged but one God; and that the many different divinities worshipped by them were but attributes and actions of one and the same God.

GODFATHERS and *Godmothers*, persons who at the baptism of infants lay themselves under an indispensable obligation to instruct them, and watch over their conduct.

GOGGLES, in surgery, instruments used for the cure of squinting, or that distortion of the eyes which occasions this disorder. They are short conical tubes, composed of ivory stained black, with a thin plate of the same ivory fixed in the tubes; through the centre of the plates is a small circular hole, about the size of the pupil of the eye, for the transmission of the rays of light.

GOLD is a yellow metal, of much greater specific gravity than any other body in nature, except platina. It is soft, very tough, ductile, and malleable; unalterable and fixed, whether exposed to the atmosphere, or to the strongest heat of furnaces.

No acid acts readily upon gold but the nitro-muriatic acid, called aqua-regia, and the oxygenized muriatic acid.

When gold is immersed in aqua-regia, an effervescence takes place with the escape of gas; the solution tinges animal matters of a deep purple, and corrodes them. By careful evaporation, fine crystals of a topaz colour are obtained. The gold is precipitated from its solvent by a great number of substances. Lime and magnesia precipitate it in the form of a yellowish powder. Alkalies exhibit the same appearance; but an excess of alkali redissolves the precipitate.

Ammonia precipitates the solution of gold much more readily than fixed alkalies. This precipitate, which is of a brown, yellow, or orange colour, possesses the property of detonating with a very considerable noise, when gently heated. It is known by the name of *aurum fulminans* or *fulminating gold*.

Most metallic substances precipitate gold from aqua-regia: lead, iron, and silver, precipitate it of a deep and dull purple colour; copper and iron throw it down in its metallic state; bismuth, zinc, and mercury, likewise precipitate it. A plate of tin, immersed in a solution of gold, affords a purple powder, called the *purple powder of Cassius*, which is used to paint in enamel.

Ether, naphtha, and the *essential oils*, take gold from its solvent, and form liquors which have been called *potable gold*. In the dry way, gold resists the action of neutral salts, more especially nitre, which deflagrates with the imperfect metals.

Earths and alkalies do not act on gold in the dry way. Sulphur, which combines with most metals, has no effect on this.

Sulphuret of potash dissolves gold in the dry way. Most metals unite with gold by fusion. With silver it forms a compound, which is paler in proportion to the quantity of silver added. A strong heat is necessary to combine platina with gold: it greatly alters the colour of the gold if its weight exceed the forty-seventh part of the mass. Mercury is strongly disposed to unite with gold, in all proportions, with which it forms an amalgam. Lead unites with gold, and considerably impairs its ductility, one-fourth of a grain to announce rendering it completely brittle. Copper renders gold less ductile, harder, more fusible, and of a deeper colour. This is the usual addition in coin, and other articles used in society. Tin renders it brittle in proportion to its quantity. With iron it forms a grey mixture, which obeys the magnet, is very hard and is said to be much superior to steel for the fabrication of cutting instruments. Bismuth renders gold white and brittle; as do likewise nickel, manganese, arsenic, antimony. Zinc produces the same effect; and, when equal in weight to the gold, a metal of a fine grain is produced, which is said to be well adapted to form the mirrors of reflecting telescopes, on account of the fine polish it is susceptible of, and its not being subject to tarnish.

Gold is found mostly in the metallic state, though generally alloyed with silver, copper, iron, or all three. It is found either in separate lumps, or visible grains, among the sands of rivers. The principal gold mines in Europe are those of Hungary. Certain martial pyrites in Sweden and elsewhere, likewise contain gold.

The principal use of gold is as the medium of exchange in coin, for which it has been chosen to occupy the first place, on account of its scarcity, its great weight, and its not being subject to tarnish. The gold coins of Great Britain contain eleven parts of gold and one of copper. See *Aurum* and *Assaying*.

GOLD-WIRE, a cylindrical ingot of silver, superficially gilt, or covered with gold at the fire, and afterwards drawn successively through a great number of little round holes, of a wiredrawing-iron, each less than the other, till it is sometimes no bigger than a hair of the head. See *Wire-drawing*.

GOLD-WIRE, *flatted*, is the former wire flatted between two rollers of polished steel, to fit it to be spun on a stick, or to be used flat, as it is without spinning, in certain stuffs, laces, embroideries, &c.

GOLD-THREAD, or *spun-gold*, is flatted gold wrapped or laid over a thread of silk, by twisting it with a wheel and iron bobbins.

GOLD-BEATING. A quantity of pure gold being melted and formed into an ingot, reduced, by forging into a plate about the thickness of a sheet of paper, the gold-beat ers cut the plate into little pieces about an inch square, and lay them in the first or smallest mould to begin to stretch them; after they have been hammered here a while with the smallest hammer, they cut each of them into four, and put them into the second mould, to be extended further. Upon taking them hence, they cut them again into four, and put them into the third mould, out of which they are taken, divided into four as before, and laid in the last or finishing mould, where they are beaten to the degree of thinness required.

They take them out of the mould, and dispose them into little paper books, prepared with a little red bole for the gold to stick to, each book ordinarily contain 25 gold leaves.

GOLD, *burnished*, that smoothed or polished with a burnisher.

GOLD, *mosaic*, that applied in pannels on proper ground, distributed into squares, lozenges, and other compartments, part whereof is shadowed to heighten or raise the rest. See *Mosaic*.

GOLD, *shell*, that used by the illuminers, for writing gold letters. It is made of leaf-gold, reduced into an impalpable powder, by grinding on a marble with honey. After leaving it to infuse some time in aquafortis, they put it in shells, where it sticks. To use it, they dilute it with gum water, or soap-water.

GOLD, *pure*, that purged by fire of all its impurities, and all alloy. The moderns frequently call it gold of 24 carats. Gold of 22 carats has one part of silver, and another of copper; that of 23 carats has half a part (that is, half a twenty-fourth) of each. See *Carat*.

GOLDFINCH, See *Fringilla*.

GOLD *size*. See *Size*.

GOLDSMITH, or, *silver-smith*, an artist who makes vessels, utensils, and ornaments in gold and silver. The work is either performed in the mould, or beat out with the hammer, or other engine. All works that have raised figures are cast in a mould, and afterwards polished and finished: plates, or dishes, of silver or gold are beat out from thin flat plates, and tankards and other vessels of that kind are formed of plates, soldered together, and their mouldings are beat, not cast. The goldsmith is to make his own moulds, and for that reason ought to be a good designer, and have a taste in sculpture: he also ought to know enough of metallurgy, to be able to assay mixed metals, and to mix the alloy.

GOLDEN *number*, a number shewing what year of the moon's cycle any given year is. See *Chronology*.

GOLDEN *rod*. See *Solidago*.

GOLDEN *rule*, in arithmetic, is also called the rule of three, and the rule of proportion. See *Proportion*, and *Rule of Three*.

GOMPHIA, in botany, a genus of the decandria monogynia class and order: calyx five-leaved; corolla five petalled; berries two, on a large receptacle; seed solitary. There are three species.

GOMPHRENA, *glob amaranth*, a genus of the pentandria digynia class and order. Natural order of amaranthi, Jussieu. Essential character: calyx coloured, outer three leaved; leaflets two, converging, keeled; petals rude, villous; nectary cylindric, five-toothed; style cloven half way; capsule one-seeded. There are nine species.

GONATOCARPUS, in botany, a genus of the tetrandria monogynia class and order. Essential character: corolla four-cleft; drupe eight-cornered, one-seeded. There is only one species; viz. G. micranthus.

GONDOLA, in naval architecture, a flat kind of boat, very long and narrow, chiefly used on the canals at Venice.

GONG, in music, an instrument used in China, is made of a metal composed of silver, lead, and copper, and its shape is a sort of circular concave. The tone is loud, harsh, and clanging.

GONIOMETRY, a method of measuring angles with a pair of compasses, and that without any scale whatever, except an undivided semicircle.

GONIUM, in natural history, a genus of the vermes infusoria. Worm very simple, flat, angular, invisible to the naked eye. There are five species, of which G. pectorale is quadrangular, pellucid, with sixteen spherical molecules. It is found in pure water: molecules green, nearly equal in size, set in a quadrangular membrane like diamonds in a ring, the lower ones larger than the rest.

GONORRHŒA. See *Medicine*.

GOODENIA, in botany, the pentandria monogynia class and order. Campanulaceæ, Jussieu. Essential character: corolla longitudinally cloven on the upper side, exposing the organs of fructification; border five-cleft, leaning one way; anthers linear; stigma cup-shaped, ciliated; capsule two-celled, two-valved, with a parallel partition; seeds many, imbricate. There are nine species; all natives of New South Wales.

GOOD *behaviour*, in law. Surety for good behaviour, is the bail for any person's good conduct for a certain time; as surety for the peace is a recognizance taken by a competent judge of record for keeping the king's peace. Justices of the peace may also bind persons of evil fame to their good behaviours.

GOOGINGS, in naval affairs, clamps of iron or other metal, bolted on the stern-post, on which to hang the rudder; for this purpose there is a hole in each of them to receive a correspondent spindle, bolted on the back of the rudder, which turns thereby as on hinges.

GOOLE, in law books, signifies a breach in a sea-bank, or wall.

GOOSE. See *Anas*.

GOOSE *berry*. See *Ribes*.

GOOSE *neck*, in a ship, a piece of iron fixed on the end of the tiller, to which the laniard of the whip staff, or the wheel rope comes for steering the ship.

GOOSE *wing*, in the sea-language, when a ship sails before, or with, a quarter wind on a fresh gale, to make the more haste, they launch out a boom, and sail on the lee-side; and a sail so fitted, is called a goose-wing.

GORDIUS, *hair-worm*, a genus of the vermes intestina class and order. Body round, filiform, equal, smooth. There are five species. G. aquaticus is from four to six inches long, of a pale brown colour, but darker at the extremities: it is found in stagnant waters, and twists itself into various contortions and knots; and it is said that if it is handled without caution, it will inflict a bite that occasions the whitlow.

GORDONIA, in botany, *loblolly-bay*, a genus of the monadelphia polyandria class and order. Natural order of columniferæ. Malvaceæ, Jussieu. Calyx five-leaved; petals five, united at the base by the nectary; capsule superior, five-celled; seeds winged. There are three species.

GORE, in heraldry, one of the abatements, which denotes a coward. It is a figure consisting of two arch lines drawn one from the sinister chief, and the other from the sinister base, both meeting in an acute angle in the middle of the fess point.

GOREING, in the sea-language, sloping. A sail is cut goreing, when it is cut sloping by degrees, and is broader at the clue, than at the earing.

GORGE, in fortification, the entrance of the platform of any work.

GORGED, in heraldry, the bearing of a crown, coronet, or the like, about the neck of a lion, a swan, &c. and in that case it is said, the lion or cygnet is gorged with a ducal coronet, &c. Gorged is also used when the gorge, or neck of a peacock, or the like bird, is of a different colour or metal from the rest.

GORGONIA, in natural history, a genus of the vermes zoophyta class and order. Animal growing in the form of a plant; stem, coriaceous, corky, woody, horny, or bony, composed of glassy fibres or like stone, striate, tapering, dilated at the base, covered with a vascular or cellular flesh or bark, and becoming spongy and friable when dry; mouths or florets covering the surface of the stem and polype bearing. There are about forty species. See *Zoophites*.

GORTERIA, in botany, a genus of the syngenesia polygamia frustranea class and order. Natural order of compositæ capitatæ. Corymbiferæ, Jussieu. Essential character: calyx imbricate, with spiny scales; corolla of the ray ligulate; down woolly; receptacle naked. There are thirteen species, mostly shrubby plants from the Cape of Good Hope.

GOSSAMER, is the name of a fine filmy substance, like cobweb, which is seen to float in the air in clear days in autumn. This is probably formed by the flying spider, which, in traversing the air for food, shoots out these threads from its anus, which are borne down by the dew, &c.

GOSSYPIUM, or cotton, a genus of the polyandria order, in the monadelphia class of plants, and in the natural order of columniferæ. Calyx is double, the exterior one trifid; the capsule quadrilocular; seeds wrapt in cotton wool. There are six species, all of them natives of warm climates. 1. The herbaceum, or common herbaceous cotton, has an herbaceous smooth stalk two feet high branching upwards; five-lobed smooth leaves; and yellow flowers from the ends of the *branches, succeeded by* roundish capsules full of seed and cotton. 2. The hirsutum, or hairy American cotton, has hairy stalks branching laterally two or three feet high; palmated, three and five-lobed hairy leaves; and yellow flowers, succeeded by large oval pods furnished with seeds and cotton. 3. The barbadense, or Barbadoes shrubby cotton, has a shrubby stalk branching four or five feet high, three-lobed smooth leaves, glandulous underneath; and yellow flowers succeeded by oval pods containing seeds and cotton. 4. The arboreum or tree cotton, has an upright woody perennial stalk, branching six or eight feet high; palmated, four or five lobed smooth leaves, and yellow flowers succeeded by large pods filled with seeds and cotton. The first three species are annual, but the fourth is perennial both in root and stalk. 1. In warm countries these plants are cultivated in great quantities in the fields for the sake of the cotton they produce: but the first species is most generally cultivated. The pods are sometimes as large as middling-sized apples, closely filled with the cotton surrounding the seed.

The cotton shrub that supplies our manufactures requires a dry and stony soil. A western exposure is fittest for it. The culture of it begins in March and April, and continues during the first spring rains. Holes are made at seven or eight feet distance from each other, and a few seeds thrown in. When they are grown to the height of five or six inches, all the stems are pulled up except two or three of the strongest. These are cropped twice before the end of August. The same method is pursued for three years, for so long the shrub may continue. This useful plant will not thrive if great attention is not paid to pluck up the weeds that grow about it. Frequent rains will promote its growth, but they must not be incessant. When the pods are gathered in, the seeds are picked out by means of an engine composed of two rods of hard wood, about 18 feet long, 18 lines in circumference, and fluted two lines deep. They are confined at both ends, so as to leave no more distance between them than is necessary for the seeds to slip through. At one end is a little millstone, which, being put in motion with the foot, turns the rods in contrary directions. They separate the cotton, and throw out the seed contained in it.

GOTHIC *style*, in architecture. The characteristics of this manner of building are pointed arches, greater height than breadth in the proportions, and profuse ornament chiefly derived from an imitation of the leaves and flowers of plants. See *Architecture*.

GOUANIA, in botany, a genus of the polygamia monoecia class and order. Natural order of rhamni, Jussieu. Hermaphrodite, calyx five-cleft; corolla none; anthers five, under a veil; style three-cleft; fruit inferior, tripartite: male, similar, but without germ and stigma. There is only one species, viz. G. domingensis, chavstick, a native of St. Domingo.

GOVERNMENT, in general, is the polity of a state, or an orderly power constigular species; the monarchy residing in the king, the aristocracy in the house of peers, and the republic being represented by the house of commons, so as to unite the advantages and exclude the inconveniences of the several simple forms. The executive power of the laws being lodged in a single person they have all the advantages of strength and dispatch that are to be found in the most absolute monarchy, and the legislature of the kingdom being entrusted to three distinct powers, entirely independent of each other: and actuated by different springs, and attentive to different interests, there can be no inconvenience attempted by either, but will be understood by one of the other two.

GOUGE, an instrument or tool used by divers artificers, being a sort of round hollow chissel for cutting holes, &c. either in wood or stone.

GOUT. See *Medicine*.

GRACE, in music, either in vocal or instrumental performances, consists in giving due place to the decorative additions, and that easy, smooth, and natural expression of the passages which best conveys the beauties of the composition.

GRACULA, the *grakle*, a genus of birds of the order picæ. The bill convex, thick, sharp-edged, somewhat naked at the base; nostrils small near the base of the bill; tongue entire, rather sharp at the end; claws hooked and sharp. There are 13 species, of which we shall notice the following: G. kelegiosa, or the minor grakle, is of the size of a blackbird, is found in the East Indies, is rendered familiar with the greatest ease, and taught to speak with greater facility than even the parrot, and also enounces its words with more distinctness. It feeds on berries and fruits, and is particularly partial

ther they are to be
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ons is fittest for the purp
cut off the tops till they
to graft, for they keep
Take off a little of the
scion first, and then cut
to have three or four
above the claying.

The time for grafting
mid-February to mid-Mar
ward season sooner, and
one sometimes later.

Cleft-grafting has been
mon method. The stocks
should be strong, about
of an inch diameter, or mo
be used with very young
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middle as possible, so as not
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something of the wedge kind
into the slit to keep it open
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Cut the scion on each side to
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contact in every part; and if the contrivance of lipping is used, it will secure them better together. Bind and clay, and tie the work so that the wind may have no power over it.

Budding, or *inoculation*, is the most considerable mode of propagation. It is performed as soon as good shoots with good eyes of the present year can be had, so that the season may be reckoned from mid-June to mid-August.

Peaches and nectarines are propagated on plum-stocks. Plums and cherries may be inoculated on sucker stocks of any kind. Pears, if for standards, should be inoculated on pear-stocks, and on those raised from seed, rather than suckers; but if for dwarfs, quince-stocks may be best used, to keep the trees from growing off too fast. Let the scions for inoculation be taken only from the outside branches of healthy and fruitful trees but the buds must not be cut from the upper part of the scions. Before the buds are prepared, get the stock ready to receive them, by taking off lateral shoots, leaving an uncut single stem. At the part fixed on for the inoculation (which should be smooth, and rather on the north side) cut the bark through to the wood in form thus, T, the cross and the down slit being of the length necessary to take in the bud, which may be cut with from one to two inches of bark; putting the point of a knife (or some instrument, rather not of iron or steel) in to the top of the down cut of the stock, raise the bark all the way to the bottom, so that it will just receive the bud easily. There are knives made on purpose for budding, with flat ivory hafts. To procure proper buds, put your knife in (suppose) about three-fourths of an inch above the eye, and with a slope downwards cut the scion half through, then do it at the same distance below the eye, and sloping it upwards cut up the middle of the wood, till the knife meets the upper incision, so the eye, or bud, will be directly in the middle. Then separate the wood from the bark, which is to be done thus: with your nail, or the point of a knife, loosen the bark at the top, and strip it from the wood; or rather with a swan or large goose quill, made in the form of an apple-scoop (having a regular smooth edge) push it down between the bark and wood, pressing it against the wood. Examine the inside of the bark, and if there is a cavity just behind the eye or bud, it is good for nothing. The leaf that grows by the eye is to be cut down to near its footstalk. See that

A grain-weight of gold-bullion is worth about two-pence, and that of silver half a farthing.

GRAIN also denotes the component particles of stones and metals, the veins of wood, &c.

GRAINING *board*, among curriers, an instrument called also a pummel, used to give a grain to their leather. See *Currying*.

GRALLÆ, in ornithology, is an order of birds in the Linnean system, which have a beak a little cylindric, rather blunt and bare of feathers at the base; tongue is entire and fleshy, pointed at the end, and beset with bristles. The legs without feathers, above the knees. This order includes 20 genera, viz. the phœnicopterus, platalea, palamedea, mycteria, tantalus, ardea, corrira, recurvirostra, scolopax, tringa, fulica, parra, vaginalis, psophia, cancroma, rallus, scopus, glareola, hæmatopus, and charadrius.

GRAMMAR. A set of rules and observations directing to the proper use of the sorts of words composing a language. These rules are founded upon the general usage of good writers. The art of grammar is usually divided into four parts: orthography, etymology, syntax, and prosody. The first and last of these have nothing to do with grammar, except so far as they relate to the grammatical changes made on different sorts of words. Etymology refers to the arrangements of the sorts of words, and to the various changes which are made upon them. Syntax directs the employment of those changes, and the situation of the different sorts of words in a sentence. Considered as a science, grammar has for its object those principles on which its rules are founded. Grammar, as an art, refers only to particular languages; because it would be impossible to lay down any system of rules which would apply to two languages; but to a certain extent,

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of its flukes, which are furnished with strong barbs on its points.

GRASS, in botany, one of the seven natural families into which all vegetables are distributed by Linnæus. They are defined to be plants which have very simple leaves, a jointed stem, a husky calyx named a glume, and a single seed. This description includes corn as well as the grasses.

Most of these plants are annual or perennial herbs, some of them are erect, others creep upon the ground. The roots in the greatest number creep, and emit fibres from each knot or joint; in others, they are simply branched and fibrous. The stems and branches are round; the leaves are simple, alternate, entire, very long, and commonly narrow; they are generally placed immediately upon the stem, except in the bamboo, and a few others which have a foot-stalk at the origin of the leaves. The leaves form below a sort of sheath, which embraces the stem, and is generally cleft on one side through its whole length. The top of the sheath is sometimes crowned with a membrane, that is either cleft or entire, and is frequently accompanied with two appendages or ears, as in rice, pharus, darnel, wheat, rye, and barley. In others the sheath is crowned with hairs, as in millet, panic-grass, and andropogon, and in some species of panic-grass it is naked, that is, has neither membrane nor hairs. There are three sections. The flowers are hermaphrodite in plants of the first section; male and female upon the same root in those of the second; hermaphrodite and male on the same root in those of the third. They proceed either singly from the sheath of the leaves, as in lygeum; form a single spike, as in nardus and darnel; or are formed into a panicle, that is, loose spike, as in poa, agrestis, and oats. The calyx and corolla in this order are not sufficiently ascertained. In some a single scale or husk, in others two, as in nardus, supply the place of both covers; some grasses, as canary-grass, and phleum, have four husky scales, two of which serve for the calyx, and the other two for the corolla; some have five, as anthoxanthum; others six, as rice, four of which are supposed to constitute the calyx, and the other two are termed, improperly enough, the husky petals. The corolla is sometimes composed of one petal with two divisions, as in fox-tail grass. The stamina are generally three in number, and placed irregularly with respect to the situation of the calyx and the corolla. One stamen is commonly placed betwixt the seed-bud and the two small scales or external husk of the corolla, and two betwixt the seed-bud and the inner husk. Rice, zizania, and pharus, have six stamina. The anthers are long, furnished with two cells, and slightly attached to the filaments. The seed-bud is placed upon the same receptacle as the calyx, corolla, and stamina. In bobartia it is said to be placed under the receptacle of the flower. The style is generally double, and crowned with a hairy stigma or summit. The seed vessel in this order is wanting. The seeds are denotes a very grave and slow motion, somewhat faster than adagio, and slower than largo.

GRAVE *accent*, in grammar, shews that the voice is to be lowered; its mark stands thus ˋ. See *Accent*.

GRAVE *digging beetle*. See *Silpha*.

GRAVEL, a congeries of pebbles, which, mixed with a stiff loam, makes lasting and elegant walks.

GRAVEL. See *Medicine*.

GRAVER. See *Engraving*.

GRAVIMETER, an instrument for measuring specific gravities. It is executed in glass, and is of a cylindric form, being that which requires the smallest quantity of fluid. It carries two basins, one of them superior, at the extremity of a thin stem, towards the middle of which the fixed point of immersion is marked. The other, or lower basin, terminates in a point; it contains the balls, and is attached to the cylinder by two branches. The moveable suspension, by means of a hook, has the inconvenience of shortening the lever which is to secure the vertical position. The cylinder is three-fourths of an inch in diameter, and 6.85 inches in length. It carries in the upper basin an additional constant weight of five grammes, or one hundred and fifteen grains. These dimensions might be increased so as to render it capable of receiving a much more considerable weight; but this is unnecessary. M. Guyton has added a piece which he calls the plongeur, it is placed in the lower basin when used, and is consequently entirely immersed in the fluid. It is a bulb of glass loaded with a sufficient quantity of mercury, in order that its total weight may be equal to the constant additional weight added to the weight of the volume of water displaced by this piece. It will be readily understood that the weight being determined at the same temperature at which the instrument was originally adjusted, it will

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Newton demonstrates that if se- ies revolve with an equable several circles about the same nd that if the squares of their times be in the same propor- e cubes of their distances from non centre, then the centripetal the revolving bodies, by which to their central body, will be iprocal or inverse ratio of the f the distances. But it had been n by the astronomers, and parti- pler, that both these cases obtain e planets; and therefore he in- at the centripetal forces of all ts were reciprocally proportional s of the distances from the cen- eir orbits.

he whole, it appears that the re retained in their orbits by er which is continually acting m; that this power is directed he centre of their orbits: that ity or efficacy of this power in- pon an approach towards the nd diminishes on receding from , and that in the reciprocal du- tio of the distances; and that by g this centripetal force with the ravity on the earth, they are e perfectly alike.

TY, in mechanics, denotes the of bodies towards the centre of . That part of mechanics which considers the equilibrium or motion of bodies arising from gravity or weight, is particularly called *Statics*.

Gravity in this view is distinguished into absolute and relative.

Absolute GRAVITY is that with which a body descends freely and perpendicularly through an unresisting medium. See *Mechanics*.

Relative GRAVITY is that with which a body descends on an inclined plane, or through a resisting medium, or as opposed by some other resistance. See *Mechanics*.

GRAVITY, in hydrostatics. The laws of bodies gravitating in fluids make the business of hydrostatics.

Gravity is here divided into absolute and specific.

Absolute, or *true* GRAVITY, is the whole force with which the body tends downwards.

Specific GRAVITY, is the relative, comparative, or apparent gravity in any body, in respect of that of an equal bulk or magnitude of another body; denoting that gravity or weight which is peculiar to each species or kind of body, and by which it is distinguished from all other kinds. In this sense a body is said to be specifically heavier than another, when under the same bulk it contains a greater weight than that other; and reciprocally the latter is said to be specifically lighter than the former.

The specific gravity of solids is determined by weighing them first in air, and then in water. The loss of weight, arising from the action of the water, is equal to that of a mass of the fluid possessing the same dimensions as the solid. Whence it is easy to construct a general table of specific gravities, by reducing the proportion of the absolute weight to the loss sustained by immersion, into terms of which that expressing water shall be unity. If the solid be so light as to float upon water, it is convenient to attach to it a heavier body sufficient to cause it to sink, but the weight of which in water must be added in computing the loss. The specific gravity of fluids is ascertained by weighing a known body immersed in them. For the loss by immersion will accurately show the weight of the same bulk of the fluid; and, consequently, the proportion of these several quantities to the loss the same solid sustained in water, being reduced as in the other case to the common standard of unity, will exhibit the specific gravity. See *Hydrometer* and *Hydrostatics*.

The following list shews the specific gravity of several metals and other bodies to rain water. The numbers indicate the ounces avoirdupoise in the cubic foot of each body, that of water being 1000.

Pure gold cast, 19258.—hammered, 19362.—Standard gold cast, 17486.—hammered, 17589.—Pure silver cast, 10474.—hammered, 10511—Standard silver in coin, 10391.—Crude platina in grains, 15602.—Platina purified and fused, 19500.—hammered, 20377.—drawn into wire, 21042.—laminated, 22069.—Mercury, 13568.—Lead fused, 11352.—Copper fused, 7788.—drawn into wire, 8878.—Brass cast, 8396.—in wire, 8544.—Iron cast, 7207.—bar, 7788.—Steel soft, and not hammered, 7840.—hardened, from 1586 to 2390.—Ponderous spar, 4474.—Fluor spar 3180.—Pumice stone, 914.—Green glass, 2620.—English crown glass, 2520.—White flint glass, English, 3290.—Another piece, 3216.—White flint glass for achromatic uses, 3437.—White glass, French, 2892.—Glass of St. Gobin, 2488.—Brimstone, 1990.—Phosphorus, 1714 Yellow amber, 1078.—Distilled water, 1000.—Sea water, 1026.—Common spirit of wine, 837.—Spirit of wine, the purest that can be had by mere distillation, 820. —Sulphuric ether, 739.—Nitrous, 909.—Marine, 730.—Acetous, 866—Concentrated sulph. acid, 2125.—Nitric acid. 1580.—Muriatic acid, 1194.—Fluor acid, 1500.—Oil of olives, 915.—of sweet almonds, 917.—Linseed oil, 940.—Naptha, 708.—Gum elastic, 393.—Camphor, 989.—Yellow wax, 965.—White ditto, 969.—Spermaceti, 943.—Tallow, 942.—Heart of oak, 1170.—Cork, 240.

These numbers being the weight of a cubic foot, or 1728 cubic inches of each of the bodies, in avoirdupoise ounces, by proportion the quantity in any other weight or the weight of any other quantity, may be readily known.

GRAVITY, in music, is the modification of any sound by which it becomes deep or low in respect of some other sound.

GREASE. See *Horse.*

GREAT *circle sailing*, the manner of conducting a ship in, or rather pretty near the arch of a great circle, that passes through the zenith of the two places, viz. from whence she came, and to which she is bound.

GREEN, one of the original colours excited by the rays of light. See *Chromatics, Colours*, and *Optics*. The green colour depends on the absorption of carbonic acid.

GREEN, *Brunswick*, is made by saturating cold water with muriated ammonia, and adding three times as much copper clipping as ammonia. The moisture is to be evaporated, taking care that no dust

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f calycanthemæ. Salicariæ,
lyx four-cleft; petals four,
sures of the calyx; filaments
scending; capsule globular,
e-celled, containing many
e are two species, viz. G.
G. tomentosa.
enus of argillaceous earths,
e more or less porous, equa-
gh to the touch. It neither
h steel, nor effervesces with
n fresh and breathed on, it
arthy smell. Its specific gra-
om 2.0 to 2.6, and is used for
and whet-stones, and some-
ring-stones and building.
IA, in botany, a genus of the
monogynia class and order.
ler of cucurbitaceæ. Petals
r with the stamens inserted
l-shaped corolla; berry dry,
taining one seed. There is
ies, viz. G. scandens.
law books, signifies absolute
ent on another: thus, an ad-
ross is one distinct and sepa-
e manor.
ak, the English name of a bird
thors loxia. See *Loxia*.
eight, the whole weight of
es, with their dust and dross;
ag or chest wherein they are
An allowance is usually made
ross weight for tare and tret.

, a large deep cavern or den
in or rock.
Cane is a little cavern near
our leagues from Naples, the

air contained in it is of a mephitical or noxious quality; it is in truth carbonic acid gas. The vapour rises only to a certain height. When a dog or any other creature is forcibly kept below it, or cannot hold its head above it, it presently loses all motion, and falls down in a swoon; the limbs convulsed and trembling, till at last no more signs of life appear than a very weak and almost insensible beating of the heart and arteries: which, if the animal is left a little longer, quickly ceases too, and then the case is irrevocable; but if it is snatched out and laid in the open air, it soon comes to life again, and sooner if thrown into the adjacent lake.

GROTTO is also used for a small artificial edifice made in a garden, in imitation of a natural grotto.

The outsides of these grottos are usually adorned with rustic architecture, and their inside with shell-work, coral, &c. The following is a good cement for grotto-work. Take two parts of white resin, melt it clear, add to it four parts of bees-wax; when melted together, add some flour of the stone you design to cement, two or three parts, or so much as will give the cement the colour of the stone; to this add one part of the flower of sulphur; first incorporate all together over a gentle fire, and afterwards knead it with your hands in warm water. With this fasten the stones, shells, &c. after they are well dried, and warmed before the fire.

GROUND, in painting, the surface upon which the figures and other objects are represented. See *Painting*.

GROUND IVY. See *Glechoma*.

GROUND PINE. See *Teucrium*.

GROUP, in painting and sculpture, is an assemblage of two or more figures of men, beast, fruits, or the like, which have some apparent relation to each other.

GROUP, in music, one of the diminutions of long notes, which, in working, form a sort of group, knot, or bush.

GRUB, the name of worms produced from the eggs of beetles, which are at length transformed into winged insects of the same species with their parents.

GROUSE, a species of the *Tetrao*.

GRUINALES, in botany, the name of the 14th order of Linnæus's fragments. This order furnishes both herbaceous and woody plants. The roots are sometimes fibrous, and sometimes tuberous. In some species of the oxalis, wood-sorrel, they are jointed; the stems are cylindric, and the young branches in some nearly square; the buds are of a conic form, covered with scales; the leaves in some genera are simple, in others compound; the flowers are hermaphrodite; the calyx consists either of five distinct leaves, or of one leaf divided almost to the bottom into five parts; it generally accompanies the seed-bud to its maturity: the petals are five, spreading, and are frequently funnel-shaped; there are generally ten stamens, the anthers oblong, and frequently attached to the filaments by the middle; the seed-vessel is commonly a five-cornered capsule, with one, three, five, or ten cells, with one seed in each, antenna, in most species, either filiform or setaceous; wings four, deflex, convoluted: lower wings pleated; hind legs formed for leaping; claws double on all the feet. There are 61 species.

Among the most numerous species is the gryllus migratorius of Linnæus, or common migratory locust. Legions of these animals are from time to time observed in various parts of the world, where the havock they commit is almost incredible: whole provinces are in a manner desolated by them in the space of a few days, and the air is darkened by their numbers: nay, even when dead, they are still terrible; since the putrefaction arising from their inconceivable number is such that it has been regarded as one of the probable causes of pestilence in the eastern regions.

One of the largest species of locust yet known is the *gryllus cristatus* of Linnæus, which is five or six times the size of the gryllus migratorius; and, together with some others of the larger kind, is made use of in various parts of the world as an article of food.

The *gryllus viridissimus* of Linnæus is one of the largest European species, and is often seen during the decline of summer in our own country.

The *gryllus gryllotalpa*, or mole-cricket, is the most curious: and in its colour and manners differs greatly from the rest. It is of an uncouth and even formidable aspect, measuring more than two inches in length, its fore-legs are furnished with very broad feet, divided into several sharp claw-shaped segments, with which it is enabled to burrow under ground; it emerges from its subterraneous retreats only by night, when it creeps about the surface, and occasionally employs its wings in flight. The mole-cricket lives entirely on vegetables, devouring the young roots of grasses, &c. and commits great devastation in gardens.

prevent any thing
our intention or inc
GUARD, in the
performed by a bo
an army or place f
by an enemy. In
are relieved every d
every soldier's turn
GUARD, *advanc*
horse or foot, that
considerable body,
approaching danger.
GUARD, *artillery*,
the army, to secure
GUARD, *main*, th
other guards are de
GUARD, *piquet*, a
and foot always in
an alarm: the hors
died, and the riders
GUARD *boat*, a
the rounds among th
harbour, to observ
keep a good look-ou
GUARD *irons*, a
placed over the orn
ship's head or qua
from injury.
GUARD *ship*, a
the marine affairs i
and to see that the
commissioned have
duly kept.
GUARD, in fencin
to defend the bod
sword.
There are four g
sword; to form a pe
we must suppose a c
and divided into fou
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point of the sword
tom of the circle, w
its top, the body inc
this is called the pri
second guard is, w
rected to the right or

here is also a quint, or fifth
is only the return of the
word to the right, after tra-
cle to the point of the prime,
it had departed, with a dif.
tion of the body, ar n, and
common centre of all these
it to be in the shoulder.

N, in law. A guardian is
d to take care of a person
rs, who by legal imbecility
understanding is incapable
is own interest.

y nature, is the father or mo-
the common law every fa-
ight of guardianship of the
n and heir until he attains
21 years. This guardianship
urther than the custody of
erson. The father may dis-
nother, and other ancestors,
ianship by nature, by ap-
amentary guardian.

N, by the common law, or
Socage. If a tenant in so-
heir being under 14, the next
e heir, to whom the inherit-
descend, shall be guardian
nd land till 14; the heir after
his own guardian, who shall
he is 21. The guardians in
transact all affairs in their
and not in the name of the

N, *by statute or testamentary*
the stat. 12 C. II. c. 24. any
er of full age may by deed
ted by two witnesses, ap-
e of the custody of his child
orn to any person except a
ant convict, either in pos-
version till such child attain
ardian supersedes the guar-
ge, and has all actions which
might have had. Besides
the care of the estate, real
A father cannot under this
nt one to his natural child.
or, however, will upon ap-
oint the same person guar-

NS by custom, are appointed
London, in the county of
ith respect to copyhold lands
ors.

N, in chivalry, is obsolete,
d to 21 years.

AN, by appointment of the
lor. The court of chancery is
per court that hath jurisdiction
g and removing guardians,
venting them and others
g their persons or estates.
etermines, as to the right of
p, who is the next of kin, and
st proper guardian; as also
ade on petition or motion for
n of infants during any dis
; as likewise guardians re-
mpelled to give security; they
unished for abuses committed
and effectual care taken to
abuses intended them in
s or estates. All courts of jus-
guardians to infants, to see
te their rights in their re-
rts when the occasion calls

There are also some cases where an infant may elect a guardian, and the court of Chancery allows him to do so after fourteen.

GUARDIAN *of the Spiritualties*, is he to whom the spiritual jurisdiction of any diocese is committed, during the vacancy of the see.

GUAREA, in botany, a genus of the octandria monogynia class and order. Natural order of meliae, Jussieu. Calyx four-cleft; petals four; nectary cylindric, bearing the anthers at its mouth; capsule four-celled, four-valved; seeds solitary. There is only one species, viz. G. trichilioides, ash-leaved guarea. This tree is remarkable for its strong odour of musk. The wood is full of a bitter resinous substance. It is a native of South America and the West India islands.

GUDGEON. See *Cyprinus*.

GUDGEONS, in a ship, are the eyes drove into the stern-post into which the pintles of the rudder go, to hang it.

GUETTARDA, in botany, a genus of the monoecia heptandria class and order. Natural order of tricoccæ rubiaceæ, Jussieu. Calyx cylindric; corolla six or seven-cleft, funnel shaped, pistil one; drupe dry. There are four species, natives of the East and West Indies.

GUIAC. See *Resin*.

GUIDE, in music, the name given to that note in a fugue which leads off and announces the subject.

GUILANDINA, in botany, *bonduc* or *nicker-tree*, a genus of the decandria monogynia class and order. Natural order of Lomentaceæ. Leguminosæ, Jussieu; Calyx one-leafed; salver-shaped; petals inserted into the neck of the calyx, nearly equal; seed vessel a legume. There are six species. The third, or Ceylon nicker-tree is used in nephritic complaints.

GUILD, or *Gild*, a fraternity or company. It was a law among the Saxons that every freeman of 14 years of age should find sureties to keep the peace, or be committed; upon which the neighbours entered into an association, and became bound for each other, either to produce him who committed any offence, or to make satisfaction to the injured party; in order to which they raised a sum among themselves, which they put into a common stock. These guilds are now companies, with laws and orders made by themselves, by the licence of the prince.

GUINEA, a gold coin struck in England. The pound weight troy of gold is cut into 44 parts and a half, and each part makes a guinea, which is therefore equal to $\frac{2}{89}$lb. or $\frac{24}{89}$oz or 5 dwts $9\frac{39}{89}$gr.

GUINEA-PIG. See *Cavia*.

GUINEA-WORM. See *Dracunculus*.

GUITAR, or *Guitarra*, a musical instrument with five double rows of strings, of which those that are bass, are in the middle.

GULA, or *Gola*. See *Architecture*.

GULES, in heraldry, signifies the colour red, which is expressed in engraving by perpendicular lines falling from the top of the escutcheon to the bottom.

GUM, a thick transparent tasteless fluid, which exudes from certain species of trees. It is adhesive, and gradually

The oxygen is much less in quantity than the saccharine matter. See *Sugar*.

Gum readily dissolves in water, and the solution, which is thick and adhesive, is known by the name of mucilage. It is soluble also in the vegetable acids. Sulphuric acid decomposes it, and converts it into water, acetic acid, and charcoal. With the assistance of heat, muriatic acid and nitric acid, produce a similar effect. It is insoluble in alcohol and ether. Such are the chief properties of gum arabic. There are, besides this, other gums, of which the principal is denominated tragacanth, from the astragalus tragacantha, a native of the island of Crete, which is in the form of vermicular masses; it is less transparent, and more adhesive than gum arabic. In our gardens and orchards we find gum exuding from the cherry and plumb trees, which differs chiefly from gum arabic in being softer and more soluble. Gum, in a state of mucilage, exists in a number of plants, especially in the roots and leaves. It is most abundant in bulbous roots, and of these the hyacinth seems to contain the largest quantity. A pound of the bulbs of this root, when dried, yields four ounces of a powder, which, when macerated in water, give a mucilage that acts well as a mordant for fixing the colours in calico-printing. Gum is used in medicine, and is considered as a specific against the stranguary occasioned by blisters; it constitutes, under particular forms, a nutritious food, and it is well known as an important article in the manufacture of our ink.

GUM *resins*, are certain substances that have long been used in medicine. They are all solid, generally brittle and opaque, have a strong smell, and a pungent and bitter taste. They consist chiefly of gum and resin, the proportions varying with the particular substance. They are procured by wounding the plants which con-

ortars and pistols
kind excepted fro
See *Cannon*, *Howit*

GUNDELIA, a
order syngenesia
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GUNNERA, a
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GUNNERY, the
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its bullet in powde
of any battering-

when fired alone in a
y, is more than 700 feet
at the moment of explo-
ed to be four times as

wder. There are several
s. 1. By sight; thus if it
a sign that it is moist, or
much charcoal in it; so
on white paper it black-
good powder does; but
of azure colour, some-
red, it is a sign of good
ouching; for if in crush-
ngers' ends, the grains
turn into dust, without
as too much coal in it;
it under the fingers upon
board, some grains feel
er, it is a sign the sulphur
with the nitre. 3. By
p of it on a clean board,
cely to the flame and
ces, and to the marks it
the board. There are
es made use of, such as
cting by a spring, com-
shown. The best eprou-
small cannon, the bore
t one inch in diameter,
arged with two ounces of
h powder only, as a ball
and the strength of the
itely shown by the arc of

aged powder. Put part of
a sail-cloth, to which
ght of what is good; then
together, dry it in the
t up, keeping it in a dry
. If it be very bad, re-
tening it with vinegar,

yards, or 4 poles, of 5 yards and a half each; and it is divided into 100 links, of 7.92 inches each. This chain is most convenient for measuring land. An acre of land is just equal to 10 square chains, or 10 chains in length and one in breadth, or equal to 100,000 square links. Hence, the dimensions being taken in chains, and multiplied together, it gives the content, in square chains, which therefore being divided by 10, or a figure cut off for decimals, brings the content to acres; after which the decimals are reduced to roods and perches, by multiplying by 4 and 40.

GUNTER'S *line*, a logarithmic line, usually graduated upon scales, sectors, &c. It is usually divided into an hundred parts, every tenth thereof is numbered, beginning with 1, and ending with 10; so that if the first great division, marked 1, stand for one tenth of any integer, the next division, marked 2, will stand for two-tenths; 3, three-tenths, and so on; and the intermediate divisions will, in like manner, represent 100th parts of the same integer. If each of the great divisions represent 10 integers, then will the lesser divisions stand for integers; and if the great divisions be supposed each 100, the subdivisions will be each 10.

GUNTER'S *line, use of*. 1. "To find the product of two numbers." From 1 extend the compasses to the multiplier; and the same extent, applied the same way from the multiplicand, will reach to the product. Thus, if the product of 4 and 8 be required, extend the compasses from 1 to 4, and that extent laid from 8 the same way, will reach to 32, their product. 2. "To divide one number by another." The extent from the divisor to unity will reach from the dividend to the quotient:

plane of the equinoctial; the eye being supposed placed in one of the poles.

GUNTER's *scale*, is usually two feet long, and about an inch and a half broad, with various lines upon it, both natural and logarithmic, relating to trigonometry, navigation, &c. On the one side are the natural lines, and on the other the artificial or logarithmic ones. The former side is first divided into inches and tenths, and numbered from one to twenty-four inches, running the whole length near one edge. One half the length of this side consists of two plain diagonal scales, for taking off dimensions to three places of figures. On the other half or foot of this side, are contained various lines relating to trigonometry, in the natural numbers, and marked thus, viz. Rhumb, the rhumbs or points of the compass. Chord, the line of chords; Sine, the line of sines; Tang. the tangents; S. T. the semi-tangents; and at the other end of this half are: Leag. leagues. or equal parts; Rhumb, another line of rhumbs, M L. miles of longitude; Chor. another line of chords. Also in the middle of this foot are L. and P. two other lines of equal parts: and all these lines on this side of the scale serve for drawing or laying down the figures to the cases in trigonometry, and navigation. On the other side of the scale are the following artificial or logarithmic lines, which serve for working or resolving those cases; viz. S.R. the sine rhumbs; T.R. the tangent rhumbs; Numb. line of numbers; Sine, sines; V. S. the versed sines; Tang. the tangents; Meri. Meridional parts: E. P. Equal parts.

GUN-WALE, or *Gunnel*, is the uppermost wale of a ship, or that piece of timber which reaches on either side from the quarter-deck to the forecastle.

GUSSET, in heraldry, is formed by a line drawn from the dexter or sinister chief points, and falling down perpendicularly to the extreme base.

GUST, in sea language, a sudden and

GYBING, the
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the monœcia mo
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numeral, denotes 200 ;

ver it, $\overline{\text{H}}$, 200,000.
, a writ of various uses,
importance. The most
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of power. By the sta-
II. c. 2, emphatically
is act, it is enacted, that
writing, by or on behalf
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suspicion of being acces-
ict to any petit treason or
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soner from one to another, without sufficient reason or authority (specified in the act), shall, for the first offence, forfeit 100l. and for the second offence 200l. to the party grieved, and be disabled to hold his office. That no person, once delivered by habeas corpus, shall be recommitted for the same offence on penalty of 500l.

That every person committing treason or felony, shall, if he require it, the first week of the next term, or the first day of the sessions of oyer and terminer, be indicted in that term or session, or else be admitted to bail, unless the king's witnesses cannot be produced at that time; and if acquitted, or if not indicted and tried in the second term or session he shall be discharged from his imprisonment for such imputed offence; but no person, after the assize shall be open for the county in which he is detained, shall be removed by habeas corpus till after the assizes are ended, but shall be left to the justice of the judges of assize. That any such prisoner may move for and obtain his habeas corpus, as well out of the Chancery or Exchequer, as out of the King's Bench or Common Pleas; and the lord chancellor, or judges denying the same on sight of the warrant or oath that the same is refused, shall forfeit severally to the party grieved, the sum of five hundred pounds. That this writ of habeas corpus shall run into the counties palatine, cinque ports, and other privileged places;

ling to have the cause determined in some superior court; in this case the body is to be removed by habeas corpus, but the proceedings must be removed by certiorari.

Habeas corpus *ad respondendum* is where a man hath a cause of action against one who is confined by the process of some inferior court; in which case, this writ is granted to remove the prisoner to answer this new action in the court above.

Habeas corpus *ad deliberandum, et recipiendum*, is a writ which lies to remove a person to the proper place or county where he committed some criminal offence.

Habeas corpus *ad satisfaciendum* lies after a judgment, when the party wishes to bring up a prisoner to charge him in execution in the inferior court.

Habeas corpus upon a *cepi* lies where the party is taken in execution in the court below.

Habeas corpus *ad testificandum* lies to remove a person in confinement, in order to give his testimony in a cause depending

HABIT, in philosophy, an aptitude or disposition either of mind or body, acquired by a frequent repetition of the same act.

HACKLE, an implement used in dressing flax.

HÆMANTHUS, in botany, a genus of the hexandria monogynia class and order. Natural order of spathaceæ; Narcissi, Jussieu. Involucre six-leaved, many-flowered; corolla six-parted, superior; berry three-celled. There are eight species.

HÆMATOPUS, the *oyster-catcher*, a genus of birds of the order grallæ. Generic character: bill compressed, the tip an equal wedge; nostrils linear; tongue about a third part of the length of the bill; toes three; placed forwards, the outer one joined to the middle by a strong membrane. This bird is sixteen inches

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volucre, three-leaved, perianthers four-leaved: petals four; nut two horned, two-celled. There is only one species, viz. H. virginica, witch hazel.

HAMELIA, in botany, a genus of the pentandria monogynia class and order. Natural order of rubiaceæ, Jussieu Corolla five cleft, berry five-celled, inferior, many seeded. There are four species, natives of the West Indies.

HAMMER, a tool used by mechanics, consisting of an iron head, fixed crosswise upon an handle of wood.

HAMMOCK, in naval affairs, a piece of hempen cloth six feet long and three feet wide, gathered together at the two ends by means of a clue, and slung horizontally under the deck, forming a receptacle for a bed.

HAMSTER. See *Mus*.

HANAPER *office*, in the court of chancery, is that out of which all original writs issue that pass under the great seal, and all commissions of charitable uses, sewers, bankrupts, and the like.

HAND. See *Anatomy*.

HAND *breadth*, a measure of three inches.

HAND *cuffs*, an instrument formed of two circular pieces of iron, each fixed on a hinge on the ends of a very short iron bar, which being locked over the wrists of a malefactor, prevents his using his hands.

HAND *spikes*, wooden levers used at sea to traverse the ordnance, or to turn the windlass in weighing up the anchor, &c.

HANDS, in heraldry, are borne in coat-armour dexter and sinister, expanded or open.

HANKS, in naval affairs, wooden rings fixed upon the stays to confine stay-sails at different distances. They are formed by bending a tough piece of wood into the

the manor, or in the king's highway.

HARMATTAN, a wind which blows periodically from the interior parts of Africa towards the Atlantic ocean. It prevails in December, January, and February, and is generally accompanied with a fog or haze that conceals the sun for whole days together. Extreme dryness is the characteristic of this wind; no dew falls during its continuance, which is sometimes for a fortnight or more. The whole vegetable creation is withered, and the grass becomes at once like hay. The human body is also affected by it, so as to cause the skin to peel off, but it stops the progress of infection, and cures almost all cutaneous diseases.

HARMONICA, or *Armonica*, a musical instrument constructed with drinking glasses. The glasses are blown as nearly as possible in the form of hemispheres, having each an open neck or socket in the middle. The diameter of the largest glass is nine inches, and that of the smallest three inches: between these there are 23 different sizes, differing from each other a quarter of an inch in diameter. When the glasses are tuned they are fixed on a round spindle of hard iron, an inch in diameter at the thickest end, and tapering to a quarter of an inch at the smallest. The glasses are all placed within one another; the largest on the biggest end of the spindle, with the neck outwards; the next in size is put into the other, leaving about an inch of its brim above the brim of the first; and the others are put on in the same order. From these exposed parts of each glass the tone is drawn, by laying a finger upon one of them as the spindle and glasses turn round. The fingers should be first soaked in water, and rubbed occasionally with fine chalk, to make them catch the glass, and bring out the tone more readily. The tones of this instrument are incomparably sweet beyond those of any other, and when it is once well tuned, it

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HARMONY
Harmony, a so
of by many of
and fathers, su
the sweetly-tu
and planets.

HARP, a stri
of a triangular
which are dist
from the up
sides. Its sc
common comp
ed by semitoni
and when us
of the perform
by the action
of both hands

HARPING-I

HARPINGS,
breadth at the
bends that are

HARPSICH
ment, consisti
mahogany or
containing the
over which the
ported by brid
are disposed,
the naturals, a
and flats. Th
the fingers,
raise little up
called jacks,
plectrums, wh
great advanta

ent; petals four spread-
, inclosing two seeds.
ne species, viz. H.
n the woods near the
e.
zoology, a large four-
cicada kind.
A, in botany, a genus
digynia class and or-
r of umbellatæ. Corolla
k, male: seeds in the
uble, with a notched
olitary, pitcher-shaped,
here are two species.
The materials for mak-
fur, cut off from the
rs have been plucked
wool and beaver. The
xed in various propor-
ent qualities, according
article intended to be
tier is used for facing
These articles cannot
ogether unless all the
rated, or put into the
ard to each other. This
process called bowing.
laid upon an open plai-
wire, somewhat more
uare, called a hurdle,
ainst the wall. The
ed with a bow or pole
od, between seven and
ith two bridges, over
d a catgut, about one-
nch in thickness. The
velled with a basket to-
nd end of the hurdle,
ing the bow horizontally
ghtly places the bow-
a pluck with a knobbed
w-pin. The string in
part of the fur, and
nd fly partly across the

with sulphuric acid, and eight planks of wood joined together in the form of a frustum of a pyramid, and meeting in the kettle at the middle. The liquor being heated rather higher than unpractised hands could bear, the article is dipped from time to time, and worked on the planks with a roller, and also by folding or rolling it up, and opening it again. The beaver is laid on towards the conclusion of this kind of working. Beer grounds are used with beaver hats, to render the liquor more tenacious, so that the hat is enabled to hold a greater quantity of it for a longer time.

The next thing to be done is to give it the form required by the wearer. For this purpose, the workman turns up the edge or rim to the depth of about an inch and a half, and then returns the point back again though the centre or axis of the cap, so far as not to take out this fold, but to produce another inner fold of the same depth. The point being returned back again in the same manner produces a third fold; and thus the workman proceeds until the whole has acquired the appearance of a flat circular piece. This is laid upon the plank, where the workman, keeping the piece wet with the liquor, pulls out the point with his fingers, and presses it down with his hand, at the same time turning it round on its centre in contact with the plank, till he has, by this means, rubbed out a flat portion equal to the intended crown of the hat. In the next place he takes a block, to the crown of which he applies the flat central portion of the felt, and by forcing a string down the sides of the block, he causes the next part to assume the figure of the crown, which he continues to wet and work until it has properly disposed itself round the block. The rim now what in the shape of that used by tailors, but shorter and broader on the face.

When the rim of the hat is not intended to be of an equal width throughout, it is cut by means of a wooden or metallic pattern. When the hat is completely finished, the crown is tied up in gauze paper, which is neatly ironed down. It is then ready for the subsequent operations of lining, &c.

HATS are also made of chips, straw, or cane, by platting, and sewing the plats together; beginning with the centre of the crown, and working round till the whole is finished. Hats are also wove and made of horse hair, silk, &c. See *Straw hat.*

HATCHEL, or *Hitchel*, a tool with which flax and hemp are combed into fine hair. It consists of long iron pins, or teeth, regularly set in a piece of board.

HATCHES, in a ship, a kind of trap-doors between the main-mast and fore-mast, through which all goods of bulk are let down into the hold.

HATCHES, also denote flood-gates set in a river, &c. to stop the current of the water.

HATCHWAY, the place where the hatches are.

HATCHING, the maturating fecundated eggs, whether by the incubation and warmth of the parent bird, or by artificial heat.

HATCHMENT, in heraldry, a name sometimes used for an achievement, or escutcheon over a gate, door, or on the side of an house.

HATCHMENT, also signifies the marshalling of several coats of arms to an escutcheon.

HAUL *the wind*, in naval affairs, to direct the ship's course nearer to that point of the compass from which the wind arises.

HAUTBOY, a musical instrument of the wind kind, shaped much like the flute,

ten a chance to fiv
in short, four, five,
and ten, are chan
of these nick it not
when the chance
main, as five and
and twelve; seven
twelve. Here obs
to nine, seven, and
to nine, eight, six,
ace and deuce ace,
whatever. See *Ch*

HAZLE. See *Co*

HEAD. See *An*

HEAD-ACHE. S

HEADBORROW,
chief of the frank p
also burrowhead, b
row, tithing man, ch
elder. He is now
constable.

HEAD-LINES, in
of all sails which are
by which they are

HEAD-SEA, is w
billow comes right a

HEAD-SAILS, in a
long to the fore mast

HEALTH, is a ri
body, and of all its

HEARING. See *S*
The organ of hea
particularly the audi
brane. See *Anatomy*

HEARSE. see *H*

HEAT. See *Ca*
mistry.

HEAT, *animal.* S

HEAT, in geogra
heat of climates and
from the different
the sun's rays strike
the earth. The differe
cold in different plac
in a very great meas
dents of situation, w
tains and valleys, an

See *Erica*.
S, in general, the same with
Weight.
EXITIA, in botany, a genus
amia angiospermia class and
x emarginate, cleft under-
la one-lipped, lip ascending,
aments inserted into the edge
of the corolla; capsule con-
eeds. There are six species,
e Cape.
See *Medicine*.
or *ivy*, a genus of the pen-
gynia class and order. Na-
of hederaceæ. Caprifolia,
ential character: petals five,
ry five-seeded, surround-
alyx. There are six species,
varieties. The roots of
ivy are used by leather-
et their knives upon. Apri-
hes covered with ivy during
February, have been observ-
ruit plentifully. The leaves
ous taste; they are given to
ermany, as a specific for the
e common people of England
to issues; and an ointment
em is in great esteem among
lers of Scotland as a ready
s. Horses and sheep eat
oa's and cows refuse it.
EÆ, in botany, the name of
h order of Linnæus's Frag-
Natural Method, consisting
ae, and a few other genera,
their general habit and ap-
n nearly allied. This order
baceous and shrubby plants,
h, particularly the ivy and
tioned, have creeping bran-
ch themselves by tendrils to
their neighbourhood. See

in agriculture, are either
ike fences round inclosures,
e several parts of a garden.
d as outward fences, they
ther with hawthorn, crabs,
e; but for gardens, some
eens, in which case the holly
he yew, then the laurel, lau-
lyrea, &c. others prefer the
rnbeam, and the elm.
. See *Erinaceus*.
rrow. See *Motacilla*.
, in botany, a genus of the
nogynia class and order.
othed; corolla four-cleft;
apsules tricoccous; seed a
only one species, viz H. bal-
fty tree more than sixty feet
nearly five feet in circum-
tive of St. Domingo. The
for many purposes: the red
s from the bark has a strong
l, and is serviceable in the
ds.
YA, in botany, a genus of
oesandria class and order.
r of scabridæ. Urticæ, Jus-
eight or ten cleft; corolla
filaments none; anthers in
the calyx, four-furrowed,
lip: female, germs pedi-
pedicelled, one-seeded.

There is one species; viz *H. dentata*, a native of New Zealand.

HEDYCREA, in botany, a genus *of* the pentandria monogynia class and order. Calyx one-leafed, hemispherical, five-toothed; corolla none; drupe oval, one-celled; nut ovate, covered with fibres, one-celled: the shell hard. There is but one species; viz. H. incana, a small tree of Guiana, where it is called caligna by the natives, who are remarkably fond of the fruit.

HEDYOSMUM, in botany, a genus of the monœcia polyandria class and order; male, ament covered with anthers; no perianth, corolla, or filaments: female, calyx three-toothed; corolla none; style one, three cornered; berry three-cornered, one-seeded. There are two species, natives of Jamaica.

HEDYOTIS, in botany, a genus of the tetrandria monogynia class and order. Natural order of stellatæ. Rubiaceæ, Jussieu. Essential character: corolla monopetalous, funnel-shaped; capsule two celled, many-seeded, inferior. There are eight species, natives of the East and West Indies.

HEDYPNOIS, in botany, a genus of the syngenesia polygamia qualis class and order. Natural order of compositæ semiflosculosæ. Cichoraceæ, Jussieu. Calyx calycled, with short scales; seeds crowned with the calycle; outer without down, covered up in the scales of the calyx, inner having a down of five erectish awned chaffs: receptacle naked, hollow dotted.

HEDYSARUM, in botany, a genus of the diadelphia decandria class and order. Natural order of papilionaceæ or leguminosæ. Corolla, keel transversely obtuse; legume jointed, with one seed in each. There are ninety species, only one of which is a native of Great Britain; viz. H. onobrychis, saintfoin, or cockshead, and but ten which are natives of Europe. Most of these are perennial. H. gyrans, sensitive hedysarum, is a wonderful plant on account of its voluntary motion.

HEEL. See *Anatomy*.

HEEL, in the sea language. If a ship leans on one side she is said to heel a starboard or a-port; or that she heels offwards, or to the shore.

HEEL *of the mast*, that part of the foot of any mast which is pared away slanting on the aftward side thereof, in order that it may be stayed aftward on.

HEGIRA, a celebrated epocha among Mahometans. See *Chronology*. The event which gave rise to this epocha was the flight of Mahomet from Mecca on the 16th of July, 622 of the Christian Æra.

HEIGHT, in geometry, is a perpendicular let fall from the vertex or top of any right-lined figure, upon the base or side subtending it. It is likewise the perpendicular height of any object above the horizon, and is found several ways, by two staffs, a plain mirror, with the quadrant, theodolite, or some graduated instrument, &c. See *Surveying*.

HEIR in law, is he to whom lands, tenements, hereditaments, by the act of God tenements, and hereditaments; but he must be of the whole blood, not a bastard, alien, &c. A custom in particular places varying the rules of descent at common law is good, such is the custom of gavelkind, by which all the sons shall inherit, and make but one heir to their ancestor.

By stat. 3 and 4 William and Mary, it is enacted that in all cases where any heir at law shall be liable to pay the debt of his ancestor in regard of any lands, tenements, or hereditaments descending to him, and shall sell, alien, and make over the same before any action brought or process sued out against him, such heir at law shall be answerable for such debt or debts in an action or actions of debt to the value of the said land so by him sold, alienated, or made over. All wills and testaments, limitations, dispositions, or appointments, of or concerning any manors, messuages, lands, tenements, or hereditaments, or of any rent, profit, term, or charge out of the same, whereof any person at the time of his decease is seised in fee simple, possession, reversion, or remainder, or has power to dispose of the same by his last will, shall be deemed and taken only against a creditor by specialty, his heirs, &c. to be fraudulent and void. And such creditor may maintain his action of debt upon his said lands and specialties, against the heir at law of such obligor, and such devisee and devisees jointly. But where there hath been any limitation or appointment, devise, or disposition, of any manors, messuages, lands, tenements, or hereditaments for the raising or payment of any just debt, or any portion, for any child of any person other than the heir at law, in pursuance of any marriage contract, *bona fide* made before such marriage; the same shall be in full force. And every devisee shall be liable in the same manner as the heir at law, notwithstanding the lands, &c. to him or them devised, shall be aliened before

HELIACAL, in as
plied to the rising or
or, more strictly speak
out of and immersio
superior splendor of t
All the fixed stars i
Mars, Jupiter, and Sa
in the morning, a litt
and a few days after th
cally. They set heliac
a little before their
But the moon rises hel
ing after the new moon
in the morning, when
conjunction with the
planets, Venus and M
are retrograde, rise hel
ing; but in the eveni
their motions. The he
ting of the moon, hap
seventeen degrees dis
but for the other plane
are required; and fo
more or less according

HELIANTHUS, in
a genus of the syngene
tranea class and order.
compositæ oppositifo
Jussieu. Calyx imb
squarrose; down two-
chaffy, flat. There ar

HELICOID *parabo*
ral, is a curve aris
sition that the common
twisted, till the axis co
ference of a circle,
retaining their places
positions with respe
these still remaining i

HELICONIA, in bo
pentandria monogyni
Natural order of scita
sieu. Spathes; peria
three-petalled; nectar
carpium tricoccous; se
are three species.

HELICTERES, in b

ER., the name of an instru-
uring with particular exact-
ters of the heavenly bodies,
those of the sun and moon.
telescope, consisting of two
of equal focal distance, pla-
n by the side of the other, so
eye-glass serves for both.
a conical form, larger at the
ich receives the two object
the lower, which is furnish-
-glass and micrometer. By
on of this instrument two
s of an object are formed in
the eye-glass, whose dis
ing on that of the two object-
ne another, may be measur-
acy.

TRIC *latitude of a planet*,
of a line drawn between
he sun and the centre of a
plane of the ecliptic.

TRIC *place of a planet*, the
cliptic wherein the planet
to a spectator placed at the
un.

LA, in botany, a genus of
mia siliquosa class and or-
order of siliquosæ, cruci-
ciferæ, Jussieu. Nectaries
ick towards the bladder of
ere are ten species, natives
Good Hope.

PE, a telescope, fitted for
sun without hurting the

PE, in mineralogy, a spe-
at genus. It is of a green
occurs massive, in angular
ces; it is commonly trans-
edges; the specific gravity
. From the beauty of the
great hardness, it is reck-
value among lapidaries.

PIUM, in botany, a genus
dria monogynia class and
ral order of asperifoliæ.
ssieu: corolla salver-shap-
, with teeth interposed;
with arches. There are
pecies, of which H. peru-
vian turnsole, is a small
, from two to three feet in
ows naturally in Peru: it
s great part of the year, and
which come out early in the
ucceeded by ripe seeds in

geometry, the same with
ce.

natural history, the *snail*, a
ermes testacea class and or-
a limax; shell univalve,
phanous, brittle; aperture
mi-lunar or roundish. Of
e than three hundred spe-
en enumerated. H. forma
th five spires remarkably
ghtly umbilicated, fasciated
and deeper brown, is found
of the southern counties of
is used in many parts of Eu-
particularly at Rome during
Lent; here they are fatten-
to a very large size. H.
rden-snail, has an imper-
globular, pale, with broad
rown bands; *this species*

inhabits the garden and orchard in most parts of Europe; it abounds with a viscid slimy juice, which it readily gives out by boiling in milk and water, so as to render them thick and glutinous, and the compound, especially with milk, is reckoned efficacious in consumptive cases. Snails are very destructive to wall-fruit: lime and ashes sprinkled on the ground will keep them away, and destroy the young brood. Fruit, already bitten, should not be taken off the tree, for they will not touch the other, till they have wholly eaten this, if left for them. Eyes of snails are lodged in their horns, one at the end of each horn, which they can retract at pleasure. Cutting off a snail's head, a little stone appears, which is supposed to be a great diuretic, and good in all nephritic disorders. So small an animal as the snail, is not free from the plague of supporting other smaller animals; lice being found sometimes on the surface of its body, and worms within its intestines.

HELLEBORUS, in botany, English *hellebore*, a genus of the polyandria polygynia class and order. Natural order of multisiliquæ. Ranunculaceæ, Jussieu. Essential character: calyx none: petals five, or more; nectary two lipped, tubular; capsules many-seeded. There are seven species. The root is tuberous. By distillation, an extremely poisonous oil is obtained from it.

HELM, in naval architecture, a long and flat piece of timber, or an assemblage of several pieces, suspended along the hind part of a ship's stern-post, where it turns upon hinges to the right or left, serving to direct the course of the vessel, as the tail of a fish guides the body. The helm is usually composed of three parts, viz. the rudder, the tiller, and the wheel, except in small vessels, where the wheel is unnecessary. The rudder is turned upon its hinges, by means of a long bar of timber called the tiller, which is fixed horizontally in its upper end within the vessel. The movements of the tiller to the right and left, accordingly direct the efforts of the rudder to the government of the ship's course as she advances. The operations of the tiller are guided and assisted by tackle, communicating with the ship's side, called the tiller-rope. In order to facilitate the management of the helm, the tiller-rope, in all large vessels, is wound about a wheel which acts upon it with the powers of a crane or windlass.

HELMET, an ancient defensive armour worn by horsemen both in war and in tournaments. It covered both the head and face, only leaving an aperture in the front secured by bars, which was called the visor. It is still used in heraldry by way of crest over the shield or coat of arms, in order to express the different degrees of nobility by the different manner in which it is borne. Thus, a helmet in profile is given to gentlemen and esquires: to a knight, the helmet standing forward and the beaver a little open: the helmet in profile and open, with bars, belongs to all noblemen under the degree of a duke: and the helmet forward and open, with many bars, is assigned to *kings, princes, and dukes.*

ed, and prey, with unceasing avidity, upon plant-lice. The larva is six-footed, generally ovate and hairy; the pupa mostly folliculate; the eggs are deposited in clusters on the leaves of plants, each placed on a small gummy pedicle.

HEMEROCALLIS, in botany, English *day lily*, a genus of the hexandria monogynia class and order. Natural order of lilia, or liliaceæ. Coronariæ, Linnæus. Narcissi, Jussieu. Corolla bell-shaped; the tube cylindric; stamina declining. There are five species.

HEMIMERIS, in botany, a genus of the didynamia angiospermia class and order. Natural order of personatæ. Scrophulariæ, Jussieu. Calyx five-parted; corolla wheel-form; upper lip cloven, with a nectareous bag at the base. There are three species.

HEMIONITES, in botany, English *mule fern*, a genus of the cryptogamia filices, or ferns. Capsules digested into lines, meeting together, either intersecting each other, or branched. There are eight species, natives of both Indies.

HEMISPHERE, in geometry, the half of a globe or sphere, when it is supposed to be cut through its centre in the plane of one of its great circles. See *Globe* and *Sphere*.

The centre of gravity of an hemisphere is five-eighths of the radius distant from the vertex.

HEMISPHERE is also used to denote a projection of half the terrestrial globe, or half the celestial sphere, on a plane, and frequently called planisphere.

HEMISTICH, in poetry, denotes half a verse, or a verse not completed.

HEMP. See *Cannabis*.

The cannabis sativa, or hemp-plant, is cultivated on account of its external filaments, which constitute the hemp used for cordage, canvas, cloth, &c. and the seeds abound with oil. The operations of harling, watering, breaking, swingling,

HEPTAGON, in
consisting of seven si
gles. In a regular
at the centre is =51°

polygon is =128°$\frac{4}{7}$
square of one of the
3.6339, or if a equal th
+3.634 nearly = az +

tangent of 64°$\frac{2}{7}$ = ha
polygon.

In fortification, a h
with seven bastions f

HEPTAGONAL nu
a sort of polygonal nu
difference of the term
ing arithmetical prog
meticals 1, 6, 11. &c.
together, make Hepta
&c. One of the prope
bers is, that if they be
and 9 be added to th
will be a square numb

HEPTANDRIA, the
Linnæus's system, con
hermaphrodite flower
mina or male organ
orders of this class, de
ber of styles.

HEPTARCHY, a g
persons: also a state
into seven kingdoms,
seven independent p

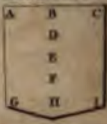
HERACLEUM, in b
a genus of the penta
and order. Natural
or umbelliferæ. Inv
corolla difform, inflex
elliptic, emarginate, o
margined. There are

HERALD, is an offi
business is to denou
peace, or be otherwis
king in martial mess

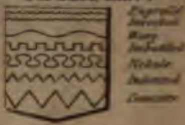
HERALDRY.

Points of the Escutcheon

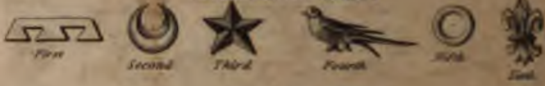
- A Dexter Chief
- B Middle Chief
- C Sinister Chief
- D Honor Point
- E Fess Point
- F Nombril Point
- G Dexter Base
- H Middle Base
- I Sinister Base



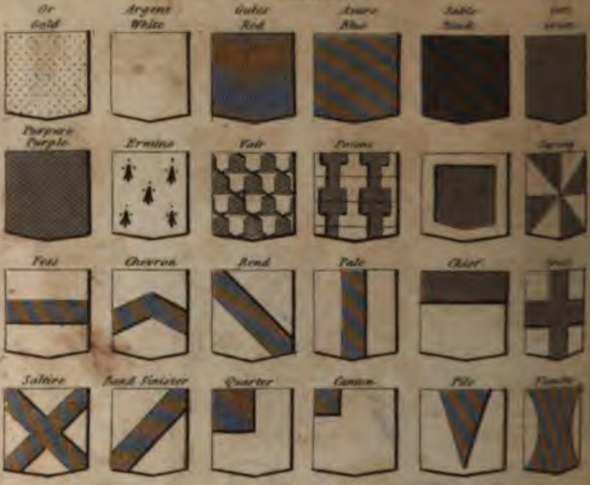
Partition Lines



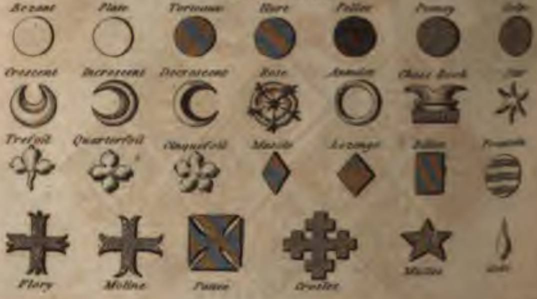
Distinctions of Houses



Colours &c.



Roundels &c.

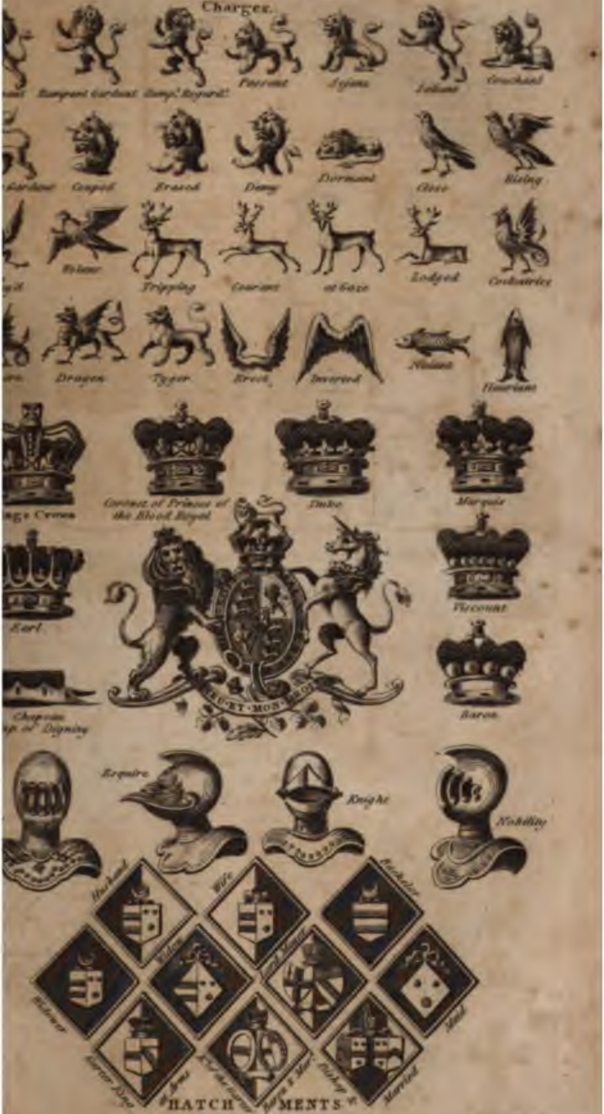


Cooper sculp

Published May 2, 1810, by R. Phillips, Bridge Street, Blackfriars, London.

HERALDRY.

Charges.



Cooper sculp.

Published May 1, 1810 by R. Phillips, Bridge Street, Blackfriars London.

sovereign princes, as a reward for tary valour, or some signal public ser- performed. These are intended to ote the descent and alliance of the er, or to distinguish states, cities, so- es, &c. civil, ecclesiastical, and mi-

ERS, in botany, is that part of the plant ch rises from the root, and is terminat- y the fructification. It comprehends runk and stem; the leaves; the ful- or supports; and the buds, or, as are sometimes denominated, the win- quarters of the future vegetable.

RBACEOUS *plants*, in botany, are which have succulent stems that die n to the ground every year.

RBAL, See *Hortus siccus.*

RCULES, in astronomy, a constella- f the northern hemisphere.

REDITAMENTS, such things immo- le, whether corporeal or incorporeal, man may leave to him and his heirs, ay of inheritance; or which not otherwise devised, naturally de- d. Corporeal hereditaments consist ly of substantial and permanent ob- all which may be comprehended r the general denomination of land incorporeal hereditaments are not bject of sensation, are creatures of ind, and exist only in contemplation. are principally of ten sorts, viz. ad- ons, tithes, commons, ways, offices, ties, franchises, presents, and rents.

RIOT, See *Harlot.*

RISSON, in fortification, a beam d with a great number of iron d, with their points outwards, and orted by a pivot, on which it turns.

RITIERA, in botany, a genus of the oecia monadelphia class and order. x five-toothed; corolla none; male ers ten, without filaments; female ma five; drupes with one subglobular d. There is but one species, viz. H. alis, looking-glass plant, a native of Indies.

RMANNIA, in botany, a genus of monadelphia pentandria class and or- Natural order of columniferæ. Tili- Jussieu. Styles five; capsule five- ; petals semitubular at the base, . There are twenty-one species. ermannias are shrubs from two to feet in height. Natives of the Cape Hope.

RMAPHRODITE, a term formerly ed exclusively to signify a human ure possessed of both sexes. The is now applied to other animals, and ants. It is well known there is no aphrodite in the human species. In species of animals, the production of aphrodites appears to be the effect of e, but in the black cattle it seems to established principle of their propa- on. When a cow brings forth two es, one of them a bull, and the other to appearance, the cow is unfit for gation. Among the country people kind of calf is called a free-martin ong the reptile tribe, such as worms, , leeches, &c. hermaphrodites are frequent. And as all these are rep- , and without bones, it is inferred that her insects which have these two ters are also *hermaphrodites.*

HERMAPHRODITE *flowers*, in botany, are so called on account of their containing both the antheræ and stigma, the supposed organs of generation, within the same calyx and petals. Of this kind are the flowers of all the *classes* in Linnæus's method except the classes monœcia and diœcia.

HERMAS, in botany, a genus of the polygamia monœcia class and order. Natural order of umbellatæ or umbelliferæ. Hermaphrodite, umbel terminating; involucre universal and partial; umbellets with truncate rays, the central one floriferous; petals five; stamina five, barren; seeds in pairs, suborbiculate: male, umbels lateral, with universal and partial involucres; umbellets many-flowered; petals five; stamina five, fertile. There are five species.

HERMETICAL *seal*, among chemists, a method of stopping glass vessels, used in chemical operations, so closely that the most subtle spirit cannot escape through them. It is commonly done by heating the neck of the vessel in a flame, till ready to melt, and then twisting it closely together with a pair of pincers.

HERNANDIA, in botany, a genus of the monoecia triandria class and order. Natural order of tricoccæ. Lauri, Jussieu. Ess. Char. male, calyx three-parted; corolla three-petaled: female, calyx truncate, quite entire; corolla six-petalled; drupe hollow, with an open mouth, and a moveable nucleus. There are two species, H. sonora, whistling hernandia; and H. ovigera, egg-fruited hernandia.

HERNIARIA, *rupture-wort*, a genus of the pentandria digynia class and order of plants. Natural order of holoraceæ. Amaranthi, Jussieu. Calyx five-parted; corolla none; stamina five, barren, besides the fertile ones; capsule one-seeded. There are four species.

HERON. See *Ardea.*

HERRING. See *Clupea.*

HESPERIDÆ, the 19th order in Linnæus's Fragments of a natural method, consisting of five genera, among which are the caryophyllus or clove-tree; and the myrtus, myrtle; allspice or pimento. The plants of this order are of the shrub and tree-kind, and chiefly ever-green.

HESPERIS, *rocket*, or *dames violet*, a genus of the tetradynamia siliquosa class and order of plants. Natural order of siliquosæ. Cruciformes, Tournefort. Cruciferæ, Jussieu. Petals bent obliquely; a gland within the shorter stamens: siliqua stiff; stigma with a forked base, and converging tip; calyx closed. There are seven species.

HETEROCLITE, a noun varying in declension.

HETEROGENEOUS, or *Heterogeneal*, consisting of parts of dissimilar kinds.

HETEROGENEOUS, in mechanics, bodies whose density is unequal in different parts of their bulk; or they are such whose gravities in different parts are not proportionable to the bulks thereof.

HETEROGENEOUS *light*, is that which consists of rays of different degrees of refrangibility.

HETEROGENEOUS *nouns*, one of the *three variations in irregular nouns*; or

Jussieu. Petals five; capsule two-beaked, two-celled. There are two species.

HETEROSCII, in geography, a term of relation denoting such inhabitants of the earth as have their shadows falling but one way.

HEXACHORD, in ancient music, a concord called by the moderns a sixth.

HEXAEDRON, or *Hexahedron*, one of the five regular or platonic bodies, so called from its having six faces. The square of the side or edge of a hexahedron, is one third of the square of the diameter of the circumscribing sphere; and hence the diameter of a sphere is to the side of its inscribed hexahedron, as $\sqrt{3}$ to 1.

HEXAGON, in geometry, a figure of six sides and angles; and if these sides and angles be equal it is called a regular hexagon. The side of every regular hexagon, inscribed in a circle, is equal in length to the radius of that circle. See *Geometry*.

To describe a regular hexagon upon a given line, describe an equilateral triangle upon it, the vertex of which will be the centre of the circumscribing circle.

HEXAGON, in fortification, a place defended by six bastions.

HEXAGYNIA, in botany, the name of an order of plants, consisting of those which, besides their classical character, have their flowers with six styles.

HEXAMETER, in ancient poetry, a kind of verse consisting of six feet.

HEXANDRIA, the name of the sixth class in the Linnæan system, consisting of plants with hermaphrodite flowers, which are furnished with six stamina or male organs that are of an equal length.

HIATUS, properly signifies an opening, chasm, or gap; but it is particularly applied to those verses where one word ends with a vowel, and the following word begins with one, and thereby occasions the mouth to be more opened, and

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by the name of sheep-tick, and is found imbedded in the wool of these animals.

HIPPOCRATEA, in botany, a genus of the triandria monogynia class and order. Natural order of acera, Jussieu. Calyx five-parted; petals five, capsule three, obcordate or elliptic. There are two species, H. volubilis, and comosa.

HIPPOCREPIS, a genus of the diadelphia decandria class and order. Natural order of leguminosæ or papilionaceæ. Legume compressed, several times emarginate along one of the sutures, curved. There are five species.

HIPPOMANE, in botany, a genus of the monœcia monadelphia class and order. Natural order of tricoccæ. Euphorbiæ, Jussieu. Male ament; perianthium bifid; corolla none; stigma three-parted; drupe or capsule three-grained. There are three species; of which H. mancinella, manchineel tree, is exceedingly large in the West Indies, almost equalling the oak in size. It is dangerous to eat of the fruit, which resembles crab-apples; it occasions vomiting, and a burning heat in the mouth, throat, and stomach, for many hours after. The juice of the buds of the white cedar is esteemed an antidote to this poison. It is said, that goats, sheep, and macaws feed greedily on the fruit. The wood is very much esteemed, and is used for ornamental purposes.

HIPPOPHAE, in botany, a genus of the dioecia class and order. Natural order of calycifloræ. Elæagni, Jussieu. Male, calyx two parted; corolla none: female, calyx bifid; corolla none; style one; berry one-seeded. There are two species, viz. H. rhamnoides, and canadensis.

HIPPOPOTAMUS, in natural history, a genus of mammalia, of the order belluæ. Generic character: four front-teeth in each jaw; the upper ones distant, in pairs; the lower ones prominent; the two intermediate ones longest; tusks solitary; those of the lower jaw very large, long, curved, and obliquely truncated; feet hoofed at the margin. This animal is supposed to be the behemoth described in the book of Job. When full grown they are from 11 to 12 feet in length. Mr. Bruce reports that they are occasionally found even of the length of twenty feet. Their form is aukward: the head astonishingly large, and the body extremely fat and round; the legs are very short and thick, and the teeth of vast strength and size. The whole animal is covered with short hair: its skin is so tough, as in some parts to resist a bullet; and its colour, when dry, is an obscure brown. It inhabits the warmer latitudes, and is to be found chiefly in the interior of Africa, in the largest rivers, in which it ranges at the bottom, sometimes reaching the surface for the purpose of respiration. By night it quits the water to feed, and devours a vast quantity of grass and the tender branches of trees. Its disposition has nothing in it sanguinary or ferocious; it never attacks other animals. It frequently commits great depredations on the plantations of corn or sugar, which are within the reach of its nocturnal progresses, and by destroying *with its vast* teeth the roots of trees. *Its motion* on land is inelegant, and slow;

it generally sleeps. When taken young, it is capable of being tamed. These animals are sometimes seen in considerable numbers, ranging for several miles beyond the banks of their rivers. They are valued by the natives of Africa for food, and the fat which it supplies is supposed to be equal to that of the hog. The feet are highly gelatinous, and regarded as a particular delicacy. With their skins the warriors of Africa are furnished with shields and bucklers. Their tusks are whiter than those of the elephant, and retain their original clearness and beauty. They are likewise of a harder consistence, and are, on both these accounts, preferred by dentists, for artificial teeth, to every other substance.

HIPPURIS, in botany, *mare's tail*, a genus of the monandria monogynia class and order. Natural order of inundatæ, Naiades, Jussieu. Calyx a two-lobed rim to the germ; corolla none; stigma simple; seed one. There are three species.

HIRÆA, in botany, a genus of the decandria trigynia class and order. Natural order of trihilatæ. Malpighiæ, Jussieu. Calyx five-leaved; petals roundish on claws; capsule three-celled, with three wings; seeds two. There is only one species, H. reclinata, a native of New Spain.

HIRCUS, in anatomy, a part of the auricle or outer ear, being that eminence next the temple. See *Ear*.

HIRCUS, *a goat*, in astronomy, a star of the first magnitude, the same with Capella. See *Capella*.

HIRCUS, is also a name used by some writers for a comet, encompassed, as it were, with a mane, seemingly rough and hairy.

HIRTELLA, in botany, a genus, of the pentandria monogynia class and order. Natural order of rosaceæ, Jussieu. Petals five; filaments very long, permanent, spiral; style lateral; berry one-seeded. There are three species.

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HISTER, a genus of insects of the order coleoptera. Antennæ clavate, the club solid; the last joint compressed, decurved; head retractile within the body; mouth forcipated; shell is shorter than the body, truncate; fore-shanks toothed, hind shanks spinous. There are twenty-four species.

HISTORY is a connected recital of past or present events.

It is the office of the historian to trace the progress of man from the savage state and through the intermediate degrees of civilization, to the nearest approach to perfection of which social institutions are capable. It falls within his province to note the effects of laws and political regulations, and to record the revolutions which have been produced in states by external violence, or the gradual corruption of antient systems of government. The record of past transactions, when diligently and minutely examined, will present to the politician matter of warning and of instruction, and in a moral point of view history is extremely useful, as it points out the issues of things, and exhibits as its general result, the reprobation consequent upon vice, and the glory which awaits virtue.

The student of history must make himself master of the details of geography, the principles of statistical calculations, and the minutiæ of chronological researches. He ought likewise to be animated by a spirit of philosophical inquiry, that he may distinguish truth from falsehood, and be able to deduce useful consequences from the facts passing in review before him, in the obscure records of former times, or amidst the misrepresentations of factious malignity. He must have a minute knowledge of the human heart, and give due weight to circumstances and situations. Let him not direct his chief attention to the frivolous anecdotes of a court, but to the circumstances which stamp the character and decide the destiny of a nation.

HITCH, in sea language, is to catch hold of any thing with a hook or rope, and by this means to hold it fast.

HIVE, in country affairs, a receptacle for bees. See *Apis*.

HOD, an instrument used to carry bricks and mortar in up ladders.

HOE, in country affairs, a tool made like a cooper's adze, to cut upwards in gardens, fields, &c.

HOFFMANNIA, in botany, a genus of the tetrandria monogynia class and order. Natural order of stellatæ. Rubiaceæ, Jussieu. Calyx four-toothed; corolla salver-shaped, four-parted; filaments none; berry two-celled, many seeded. There is only one species, viz. H. pedunculata, a native of Jamaica.

HOG. See *Sus*.

HOG, *hedge*. See *Erinaceus*.

HOLCUS, Indian mullet or corn, a genus of the polygamia monœcia class and order of plants. Natural order of grasses. Essential character: hermaphrodite, calyx glume, one or two flowered; corolla glume, awned; stamina three: styles two; seed one; male, calyx glume, two-*valved; corolla* none; stamina three. *There are* 15 species.

the hand.

HOLLAND, a fine and close kind of linen, so called from its being first manufactured in Holland.

HOLLOA. See *Hailing*.

HOLLOW *square*, in the military art, a body of foot drawn up, with an empty space in the middle for colours, drums, and baggage.

HOLLY. See *Ilex*.

HOLOCENTRUS, a genus of the order thoracici; generic character is, habit of the genus perca; gill covers scaly, serrated, and aculeated; scales in most species hard and rough. There are 35 species.

HOLOMETER, a mathematical instrument that serves universally for taking all measures, both on the earth and in the heavens.

HOLORACEÆ, in botany, the name of the twelfth order in Linnæus's Fragments of a Natural Method, consisting of pot herbs, or plants used for the table, and entering into the economy of domestic affairs.

HOLOSTEUM, in botany, a genus of the triandria tryginia class and order. Natural order of caryophyliei. Calyx five-leaved; petals five; capsule one celled, subcylindrical, opening at top. There are five species.

HOLOTHURIA, in natural history, a genus of the vermes mollusca class and order. Body detached, cylindrical, thick, naked, and open at the extremity: mouth surrounded by fleshy-branched tentacula or feelers. These are all inhabitants of the sea, and expand or contract themselves at pleasure; the anterior aperture serves them both as a mouth and vent, and from the hinder one they reject waters which had been previously drawn in; the tentacula are retractile. There are 23 species. Aristotle seems to have admitted that they possessed animal life, a circumstance that has in modern times been completely ascertained.

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NEY, a vegetable product, very si-
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bles, is collected by the bee, and
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HOP, in botany. See *Humulus*. Ho are said to have been first brought int England from the Netherlands, in th year 1524. The richest and stronges ground is the most proper for the hop; and if it is rocky within two or three feet of the surface, the hops will prosper well; but they will by no means thrive on a stiff clay or spongy wet land. Hops require to be planted in a situation so open as that the air may freely pass round and between them. The hills should be eight or nine feet asunder. Persons ought to be very curious in the choice of plants. The two best sorts are the white and the grey bind; the latter is a large square hop, more hardy, and is the more plentiful bearer, and ripens later than the former. There is another sort of the white bind, which ripens a week or ten days before the common; but this is tenderer and a less plentiful bearer, but it has this advantage, that it comes first to market. If there is a sort of hop you value, and would increase plants and sets from, the superfluous binds may be laid down when the hops are tied, cutting off the tops, and burying them in the hills; or when the hops are dressed, all the cuttings may be saved, for almost every part will grow and become a good set the next spring. Five good sets should be planted in every hill, one in the middle, and the rest round about sloping. Let them be pressed close with the hand, and covered with fine earth, and the stick should be placed on each side the hill to secure it. About the middle of March they ought to be dressed in dry weather, having with an iron picker cleared away all the earth out of the hills, with a sharp knife cut off all the shoots which grew up with the binds the last year; and also all the young suckers, that none be left to sun in the alley, and weaken the hill, to cut one part of the stock lower than the other, making that part low that was left highest the preceding year. In dressing hops that have been planted the year before, cut off both the dead tops and the young suckers which have sprung up from the sets, and also to cover the stocks with fine earth, a finger's length in thickness. About the middle of April the hops are to be poled. Two or three binds are enough for a pole and all the sprouts that you have no occasion for are to be plucked up. About the beginning of July the hops begin to blow, and will be ready to gather about Bartholomew tide. A judgment may be made of their ripeness by their strong scent, their hardness, and the brownish colour of their seed. When by these tokens they appear to be ripe, they must be picked with all the expedition possible; The best method of drying hops is with charcoal on an oast or kiln, covered with hair cloth, of the same form and fashion that is used for drying malt. It may be known when they are well dryed by the brittleness of the stalks, and the easy falling off of the hop leaves. As soon as the hops are taken off the kiln, lay them in a room for three weeks or a month to cool and then bag them; the harder they are trodden, the better they will keep.

round the axis of the globe, which, upon turning the globe fifteen degrees, will show what places have the sun an hour before or after us.

HORARY *circles* or *lines*, in dialling, are the lines or circles which mark the hours on sun-dials. See *Dialling*.

HORARY *motion of the earth*, the arch it describes in the space of an hour, which is nearly 15 degrees, though not accurately so, as the earth moves with different velocities, according to its greater or lesser distance from the sun.

HORD, in geography, is used for a company of wandering people, which have no settled habitation, but stroll about, dwelling in waggons or under tents, to be ready to shift as soon as the herbage, fruit, and the present province is eaten bare.

HORDEUM, in botany, *barley*, a genus of the triandria digynia class and order. Natural order of grasses. Essential character: calyx lateral, two-valved, one-flowered, by threes, at each toothlet of the rachis. There are nine species.

HORIZON, in astronomy and geography, that great circle which divides the heavens and the earth into two equal parts, or hemispheres, distinguishing the upper from the lower.

HORIZON *of a Globe*. See *Globe*.

HORIZONTAL, something relating to the horizon; or that is taken in, or on a level with the horizon.

HORIZONTAL *speculum*, consists in a well-polished metal speculum, about three or four inches in diameter, inclosed within a rim of brass; so fitted, that the centre of gravity of the whole shall fall near the point on which it turns.

HORIZONTAL *dial*. See *Dialling*.

HORIZONTAL *line*. See *Perspective*.

HORIZONTAL *parallax*. See *Parallax*.

HORIZONTAL *plane*, that which is parallel to the horizon of the place.

HORIZONTAL *plane*, in perspective, a plane parallel to the horizon, passing

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HORN *stone*, in minera-
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in fortification, an out-
d of two demi-bastions,
tain.

DE, in mineralogy, a spe-
genus, of which there are
es; viz. the common, the
asaltic, and the hornblende
mmon hornblende is of a
or raven-black, which in
approaches to a greyish
lvet black. It occurs in
inated and crystallized.
ty from 3.6 to 3.8. It is
a greyish streak, is mode-
nd easily frangible: it ex-
ceous odour. It melts be-
pipe into a greyish-black
ndred parts contain silica,
, 22.0; magnesia, 16.0; lime
ron, 23.0. The common
rms one of the essential
several mountain rocks.
a capital flux for iron ores,
se it is applied in Sweden.
hornblende is found in
. Paul, on the coast of La-
ally of a brownish black,
gravity is 3.38. The horn-
of a colour intermediate

between greenish and raven black; it is massive, and is generally mixed with mica and felspar. It occurs in beds of primitive rocks, particularly in clay slate; also in gneiss and mica slate, and is found principally in the northern parts of Europe. The basaltic hornblende is of a velvet black, occurs almost always in single imbedded crystals. The surface is smooth and shining, except where it happens to be covered by a thin ochery crust.

HORNET. See *Vespa*.

HOROLOGY. See *Clock*, *Dialling*, and *Chronometer*.

HOROPTER, in optics, a right line drawn through the point where the two optic axes meet parallel to that which joins the centres of two eyes or the two pupils.

HOROSCOPE, in astrology, is the degree of the ascendant, or the star that rises above the horizon at a certain moment, which is observed in order to predict some future event. The same name is also given to a scheme or figure containing the twelve houses, in which are marked the situation of the heavens and stars, in order to form predictions.

HOROSCOPE *lunar*, the point from which the moon proceeds when the sun is in the ascending point of the east.

HORS *de son fee*, an exception to avoid an action brought for rent issuing out of certain lands, by him that pretends to be the lord, or for some custom and services; for if the defendant can prove the land to be without the compass of his fee, the action fails.

HORSE. See *Equus*, *caballus*. The elegance, grace, and usefulness of the horse entitle him to particular attention, and certainly confer upon him a pre-eminence above all other quadrupeds. There are few parts of the world in which horses are not to be found; and in various parts in Siberia, and at the north-west of China, and on the banks of the Don, they maintain their original independence, and range at pleasure in herds of several hundreds, having always one or more as an advanced guard, to alarm against approaching danger. In America, likewise, horses are found wild in vast abundance, sweeping the extensive plains of Buenos Ayres, and the Brazils particularly, in immense herds. They are taken by the inhabitants by being entangled in a noosed cord, and are often destroyed merely for their hides, as an article of commerce. These American horses are the descendants of those which were introduced by the Spaniards on their discovery of America, none having previously existed on that continent. The Arabian horse is celebrated for beauty and swiftness, and has been long exported to the most remote countries of Europe, to correct and improve the native breeds. The Arabs never cross the breeds of horses. The horses of Barbary are in high reputation, also, for speed and elegance, as are likewise those of Spain. In no country of the globe, however, has the breeding of the horse been attended to with such success as in Great Britain. The English race-horse is not excelled in fleetness or beauty by the coursers of Barbary or Arabia, and more strength. The draught-horse is no where advanced to such size and power as in Great Britain. Yorkshire and Lincolnshire are the most celebrated counties for this breed, whence several have been brought to London which have each, for a short distance drawn, without difficulty, the weight of three tons, half of which is considered as the regular draught. The colour of the horse is generally considered as a matter of trifling consequence. A bright or shining bay appears in this country to obtain the preference.

Teeth and age of horses.—The horse has 24 grinders, four tushes, or single teeth, and 12 front teeth or gatherers. Mares in general have no tushes. The black mark or cavities denoting the age, are to be found in the corner front teeth, adjoining the tushes. At four years and a half old, the mark teeth are just visible above the gum, and the cavity is very conspicuous. At five, the remaining colt's-teeth are shed, and the tushes appear. At six, the tushes are up, and appear white, small, and sharp; near which is observable a small circle of young growing flesh. The horse's mouth is then complete, the corner teeth being filled up. At eight the black marks disappear.

Shoeing of horses.—The shoes should be made three times as thick at the toe as at the heels, so that by this means the frog may come down to the ground. The nails are all placed forward, four on each side, but not approaching too near the heels. They should be counter sunk in conical or wedge-shaped holes. For horses which go in shafts, or are used in hunting, it is usual to make shoes with only one heel, which should be outward. The horse's heel must be rather lowered on that side, and the inner heel of the shoe somewhat thickened so as to balance and bear equally. The best breadth for the shoe of a medium-sized horse is said to be one inch at the toe, and three quarters at the

Hor·es are subje
Anasarca, or drop
called the *water fa*
remaining after the
by the finger. Th
stimulant applicat
smart friction and
nourishing food a
When only the low
eased, rollers dipt
turpentine, will
complaint.

In *Ascites*, or dr
means should be
and accelerating th
Drastic purges, di
in some cases mer
der important serv

Bleeding should
lancet of a suitabl
very uncertain an
gular-vein is usual
thin cord should
horse's neck a li
and the part be w
vein. The quanti
case; but one or t
bleeding are enou
full-sized horse in
the bleeding is to
line, and pass a
the orifice; then
piece of thread, p
point of the pin
nate (i. e. a figur
make fast.

Breaking down,
of the suspensory
nearly touches the
can be bent when
made, though m
effected by reduci

Broken wind, is su
a rupture of the c
following are am
causes, viz. catarr
meal, or after dr
too tight; being su

if, the greatest service will be
d by warm diluting drinks, or by
rges, aided by bleeding. The
ight not to be kept too hot, as it
ender the horse tender in his
Encourage the running at the

consist of extravasated blood or
collected between the crust or
e hoof and the bars. Cut away
the extravasation and apply a
of lint, dipped in tincture of
r in balsam of Peru; then turn
out to grass without shoes, or
mbered shoe be put on, so as to
ssing the part.

The following has proved ser-
in chronic cough: Tar eight
lime twelve pounds, water six
mixed. Give a quart every

n the heels proceed from a gross
h, or washing the legs without
hem dry. Wash with strong soap
er the food, give mild purges or
and if the habit be full, bleed

s, or a profuse discharge of
generally incurable. It is often
n by violent diuretics. Bad
lso a frequent cause. Opium,
other tonics will give relief.
ea is sometimes critical; in
stance it should not be checked
d with copious diluents: when
by hard labour with bad stabling,
d, it is to be treated with great
lest it should degenerate into
inject the anodyne clyster, and
e daily, opium two drachms,
ha three drachms, prepared
r ounces, thin starch a pint. If
t answer the intention within
give alum whey, and encou-
s by means of good clothing
l, and allow a moderate current
e stable be hot.
y, commonly called *molten-*
a most dangerous complaint.
is usually afflicted with te-
and voids a great quantity of
s. The safest purge, in the
is about a quart of castor oil.
s not remove the fæces, give
four drachms, gum arabic two
with honey enough to form a
mple clysters of gruel, linseed,
. should be frequently injected.
te cases administer the follow-
ten poppy-heads, boil them in
of water till only a gallon be
starch enough to soften into a
lage, throw up three or four
y. Internally the following may
Opium two drachms, ipecacu-
drachms, nux vomica, in pow-
drachm, port wine one quart.
Repeat morning and evening.
rse be well clothed, so as to
skin moist; the stable should
. If the dung smells offensively
must be fumigated and kept
clean.
easily removed when it con-
erely a superficial inflamma-
urning the bud or swelling with
or by caustic; but when the
fected, (which is *known by the*
buds being ulcerated, and a discharge at the nose,) a scruple of corrosive sublimate, levigated, mixed with butter, or in gruel, must be given in two doses, i. e. night and morning. If the sublimate should prove too powerful, substitute a drachm of calomel, night and morning. Green food is peculiarly serviceable. Destroy the clothing after a cure, or the disease will be regenerated.

Fever. If the common inflammatory symptoms are indicated by the pulse, the eyes, and the general action of the horse, bleeding, emetics, and glyster are necessary. Avoid whatever is heating; let the animal be kept in a cold stable, and clothed moderately. Let him have plenty of warm drink of a diluent kind. When a fever is symptomatic, the cause must first be removed; in the mean while soothing palliating treatment should be resorted to. When the fever is of a malignant species, and the horse is in a robust state, bleed copiously: but if emaciated, or of a weak frame, avoid that evacuation. Wash the body with warm vinegar, in which aromatic herbs have been boiled; remove the dung instantly, and change the bedding twice or thrice within the day. Burn nitre every half hour, so as to occasion a thick smoke, and let a piece of touch-paper be always smouthering in a corner of the stable, which ought to be very cool. Keep the body open with antiseptic purges, and use little clothing. Encourage every sore which may appear, and open rowels. This complaint being highly infectious, no other horses or horned cattle, should be allowed to stand within the same area.

Fistulous withers, are very troublesome complaints. Great cleanliness is necessary; and the part should be laid open, if the situation may admit; or, at all events, that a seton should be passed through the bottom of the sore, whence the matter might be discharged. Keep the body open, and let the diet be soft and cooling; allow free ventilation, and approach the animal gently.

Founder, is an affection of the feet. When all the feet are affected the horse lies down, and is unwilling, or perhaps unable to rise. This complaint requires very copious bleeding, and ease and rest. The shoes ought to be taken off, and very soft litter be allowed. Bleeding at the toe rarely fails of giving great relief; endeavour to prevent the collection of matter. Purge well, and keep the feet cool by the frequent application of salt and water, or sugar of lead in water, or sal-ammoniac and vinegar. Pare away the crust, so as to liberate the foot from its usual constriction. When recovering, turn the animal out into a rich soft paddock, if the season permits; or into a soft straw yard. Allow no corn unless when the horse is extremely weak; and then scalded malt, &c. will answer best.

Fractions and *luxations*. In most instances cures might be effected, provided the horse could be slung, so as to take the pressure entirely off the limb. Nature in time will unite the bones of a simple fracture, after they have been set.

Grease. If it proceed from redundancy, *bleed,* purge, and use gentle exercise, means of blankets dipt therein. Give a draught of castor-oil, one pint; oil of peppermint, one drachm; mix them with the yolks of two eggs, and add a pint of water. If the bowels have not been well opened, give calomel, half an ounce; gum-gamboge, one drachm; Castile soap, half an ounce; made into a bolus with honey, and given at night; keeping on warm clothing, and cautiously avoiding a draught of wind.

Gutta serena or *glass-eyes*, absolutely incurable in horses.

Hepatitis, may be known by a yellowness of the eyes and mouth, attended with considerable fever. Bleed freely, and blister the sides, applying numerous rowels underneath. Rake and clyster; then purge well, by giving the following bolus night and morning, till it operates freely. Calomel, half a drachm; aloes, one drachm and a half; Castile soap, two drachms; mix with honey.

Hydrophobia. If a large piece be taken out as soon as the horse has been bitten; or a fire-brand be quickly applied so as to burn a deep hole, or the lunar caustic be used, the animal may be saved.

Jaundice. See *Hepatitis.*

Inflammation, in whatever part is generally the index to blood-letting. But local inflammations which seem to be critical, and push forward to suppuration, should rather be encouraged than resolved; unless they settle upon some part endangering the life. When the *brain* is inflamed, the lancet must be freely used, as must the blistering ointment and purges. The *eye* must, when in a state of irritation be kept cool, and the habit lowered. Mild solutions of white vitriol, added to a few drops of extract of saturn, should be applied, in the form of poultice, cold and frequently. When the stomach is inflamed, bleed, and clyster with soft cooling liquors. In inflamed bladder avoid diuretics; administer clysters, and give mucilaginous, soothing

from poorness of
tremely infectious
suds, and apply co
gated, eight ounces
triol each five dr
tine, three ounces
mix and rub frequ

Pole evil, arises
the collar at the b
such cause: it o
which must be br
by blistering, &c.
moved Take car
abscess, else there
nuses.

Quittors, common
lodgment of filth a
surrounding parts;
clean, and dressed
five ointment. If
flesh, should arise,
means of lunar cau

Ring bone is an e
rounding the coron
splents, *curbs*, *bon*
sometimes be cure
but when of long st
moved except by
Corrosive sublima
flies and Venice tu
with hog's-lard wil
bone, &c.

Stag-evil, or lock
ed by sudden chan
The cure will chie
the warm bath, and
Sometimes the sudd
water in great qu
viceable.

Staggers, or *phren*
thargy; only that
brain is extreme, a
outrageous. To eff
ously, from three
eight hours, until
Blister the head a
flies mixed in spir
well, and adminis

tar six drachms, emetic
and a half, warm gruel

Gentle exercise and fric-
nd the safest and the most
ly.
nning-thrush, is a discharge
ible frog. The running
ed, taking care to bring the
on by lowering the heels
bearing upon it by means
ow. Use as warm as it can
ish composed of tar two
drachms of oil of vitriol.
and mild diuretics will
ards a cure.
e soft dressings, and their
e kept low, and free from
Dress often, and in case
careful to have the vent
that the discharge may be
us flesh arise, or the edges
touch with blue vitriol, or
istic, and alteratives must
hen the wound cicatrizes,
ard very gently to soften the
the flies are troublesome,
all quantity of tobacco in

n under the saddle, in con-
unequal pressure. Perfect
st remedy; but a solution
ad in vinegar will greatly
ersion. If they become
hem, or fully extirpate by

must be removed by firm
bolster that immediately
swelling: when subdued,
ld be fired, to prevent re-
he complaint. The sweat-
made by steeping Spanish
, often has a good effect.
en a horse rubs his tail, and
er appears at times about
ns may be suspected. Com-
one of the most powerful
subjects the horse to con-
uietude. The root of the
igated, and given fresh, is
d, as is soot also. Strong
mel and gamboge will be
efficient, provided they be
so as to scour for a number
this must greatly depend
ion and constitution of the

alers. Every person exer-
e or business of an horse-
ake out a licence from the
Horse-dealers carrying on
ut a licence are liable to be
uties on riding horses.
It is lawful for any person,
by way of merchandize,
ny parts beyond the seas, in
majesty, paying for each 5s.
convicted of feloniously
se, shall have the privilege
cessaries before or after, are
of the benefit of their

be stolen out of the stable,
lage of a dwelling-house, in
, it falls under the denomi-
lary; if in the day-time, it
e denomination of larceny
se.

Keepers of slaughter-houses for horses, are subject to regulations enacted by act of 26 Geo. III. c. 71.

If any person shall unlawfully and maliciously kill, maim, or wound, any cattle, every person so offending, shall be adjudged guilty of felony.

If a horse, or other goods, be delivered to an innkeeper, or his servants, he is bound to keep them safely, and restore them when his guest leaves the house.

If a horse be delivered to an agisting farmer, for the purpose of depasturing in his meadows, he is answerable for the loss of the horse, if it be occasioned by the ordinary neglect of himself or his servants. If a man ride to an inn, where his horse has eat, the host may detain the horse till he be satisfied for the eating.

HORSE, in naval affairs, a rope reaching from the middle of a yard to its extremity, and depending about two or three feet under the yard, for the sailors to tread on while furling the sails, &c.

HORSE *leach*. See *Hirudo*.

HORTUS *siccus*, or *dry garden*, an appellation given to a collection of specimens of plants, dried and preserved. Specimens ought to be collected when dry, and carefully spread on a piece of pasteboard, covered with a single sheet of blotting paper quite dry; then place three or four sheets of the same paper above the plant, to imbibe the moisture as it is pressed out; it is then to be put into the press. At first they ought to be pressed gently. After being pressed for twenty-four hours, the plants ought to be examined, that any leaves or petals, which have been folded, may be spread out and dry sheets of paper laid over them. They may now be replaced in the press, and a greater degree of pressure applied. The press ought to stand near a fire, or in the sunshine. After remaining two days in this situation, they should be again examined, and dry sheets of paper be laid over them. The pressure then ought to be considerably increased. After remaining three days longer in the press, the plants may be taken out, and such as are sufficiently dry may be put in a dry sheet of writing-paper. Plants may be dried in a box of sand in a more expeditious manner, and this method preserves the colour of some plants better. The specimens, after being pressed for ten or twelve hours, must be laid within a sheet of blossom-paper. The box must contain an inch deep of fine dry sand, on which the sheet is to be placed, and then covered with sand an inch thick; another sheet may then be deposited in the same manner and so on, till the box be full. The box must be placed near a fire for two or three days. Plants may likewise be dried by placing within several sheets of blotting paper, and ironing them with a hot smooth iron. When properly dried, the specimens should be placed in sheets of writing-paper. Then the name of the genus and species should be written down, the place where it was found, nature of the soil, and the season of the year.

HOT-BEDS, in gardening, beds made with fresh horse-dung, or tanner's bark, and covered with glasses to defend them has taken heat again for two or three days, give it a second turn as before, and having lain the same time, it will be in proper order for making a good lasting bed with a steady heat.

HOT *house*, an erection warmed by means of flues, for the culture of tender exotics of tropical climates. The scite of a hot house is extremely important, A south-west aspect is to be preferred.

The best plan is a parellelogram, the front wall to be about a foot high; and on it a perpendicular glass frame, of about two feet and a half, should be raised so that it should stand at full three feet and a half above the ground. The breadth of the interior ought not to exceed fourteen feet, and the back wall should be high enough to give the top, or sliding frames, an angle of thirty-five degrees from the horizon. The tan binns should be excavated in a diagonal manner; shallow in front, but at their back to the depth of six feet, and divided off into compartments. The surface should partially correspond with the angle made by the upper glass frames, or at least it should stand at angle of full twenty degrees from the horizon; so that the plants rise like a flight of steps. The benches in front are all flued, and rise by regular steps, for the purpose of displaying all the plants standing on them, and to give them a proper portion of the sun's influence. The average heat of the interior should be from about 75 to 80 degrees, but at particular critical times, when pines, &c. require much forcing, it may be carried up to full 85, or even to 90 degrees, so as to correspond with the temperature of their natural climate. The entrance into a hot-house should always be by means of a small anti-chamber, shutting very close. In small hot-houses, the heat might be circulated from a kitchen fire. During the day time, in the summer season, the fires may frequently be allowed to go out; but so soon as the even-

board, may be
house officers; and
ble, the duties shall
hibited, they shall
manders of men of
officers, may comp
under, hovering w
shore, to come in
or vessel be found
within eight league
between the North
Head) unless by di
ing on board foreig
or cask not conta
any wine in casks
have wine on bo
sixty tons burthen,
of les, or twenty
fee, or any goo
forfeiture upon im
with the ship and
feited; spirits fo
not exceeding two
cepted.

HOUND. See C

HOUNDS, in na
given to those par
gradually project
side beyond the cy
face which it prese
upwards.

HOUR, *hora*, in
part of a natural d
fourth, sometimes
divided into sixty
into sixty seconds
thirds, &c.

There are diver
by chronologers, a
Sometimes *hours*
and unequal. E
ty-fourth part of a
ly, that is, the time
degrees of the equi
horizon. These a
tial hours, becaus
the equinoctial;
cause used by ast

nd from one vessel into ano-

, in astrology, denotes the twelfth
e heavens.

Every man's house is as his
well to defend him against inju-
r his repose. Upon recovery in
action or ejectment, the sheriff
k the house and deliver seisin.
e plaintiff. Where the king is
e sheriff may break the party's
ake him, or to execute other
the king; but he ought first to
cause of his coming, and re-
door to be opened; when the
n, the sheriff may enter and
ution at the suit of any subject;
the door is shut, there he can-
t to execute process at the suit
t. Though an house is a cas-
owner himself and his family
n goods, &c. yet it is no pro-
a stranger flying thither; or
of such a one to prevent lawful
, nor for persons guilty of high
breaches of the peace. A man
use his house as not to dam-
ighbours.

D, in sea language, the situation
, upon the middle and lower
. when they are run in, and the
g let down, the muzzle gets
e side above port. They are
red.

ONIA, in botany, a genus of the
monogynia class and order.
der of stellatæ. Rubiaceæ, Jus-
olla one petalled, funnel form;
perior, two celled, two-seeded.
two species, viz. H. cœrulea,
rea.

TUYNIA, in botany, a genus of
ecia monandria class and order.
der of piperitæ. Aroideæ, Jus-
x four leaved; corolla, none;
mixed with the pistils. There
ecies, H. cordata.

naval architecture, a small
e only with one mast.

N'S *bay company*. See *Com-*

NIA, in botany, a genus of the
tria monogynia class and order.
order of bicornes. Ericæ, Jus-
ential character: calyx five-
bular; corolla none; stamens
capsule one celled, three valved,
ded. There is one species, viz.
ides.

nd CRY, is the ancient common
ten after felons, and such as have
ly wounded any person, or as-
ny one with intent to rob him.
evying of hue and cry, although
od course to have a justice's war-
ere time will permit, in order to
causeless hue and cry, yet it is
essary, nor always convenient;
felon may escape before the war-
btained.

, or *Hver*, the Icelandic name for
of heated water, which are forced
at violence through apertures in
, by internal causes, to a great
that island.

NIA, in botany, a genus of the
hia decandria class and order.

Natural order of columniferæ. Malvaceæ, Jussieu. Essential character: five-styled; corolla five-petalled; drupe with a striated nut. There is but species; viz. H. mystax, a native of the East Indies.

HUGUENOTS, a term of contempt, first given to the French protestants in the year 1560. This term probably owes its origin to an erroneous pronunciation of the German word Eidgenossen, which signifies *sworn-fellows*. This had been the name of that part of the Genevans who entered into an alliance with the Swiss cantons in order to maintain their liberties against the Duke of Savoy.

HULK, in sea language, a name given to any old vessel laid by as unfit for service.

HULL, in the sea language, is the main body of a ship, without either masts, yards, sails, or rigging.

HUMANITIES, in the plural, signify grammar, rhetoric, and poetry, known by the name of *literæ humaniores*.

HUMERUS, the upper part of the arm between the scapula and elbow.

HUMIDITY. See *Hygrometer*.

HUMMING *bird*. See *Trochilus*.

HUMULUS, in botany, a genus of the dioecia pentandria class and order. Natural order of scabridæ. Urticæ, Jussieu. Essential character: male, calyx five-leaved; corolla, none; female, calyx one-leafed, spreading obliquely, entire; corolla none; styles two; seed one, within a leafed calyx. There is but one species, viz. H. lupulus, *Hops*, which see.

HUNDRED. Hundreds are not answerable to persons robbed travelling on a Sunday: but are liable to penalty on exportation of wool; to damages sustained by pulling down buildings, killing cattle, cutting down trees, burning houses, &c. destroying turnpikes or works on navigable rivers; cutting hop-binds, destroying corn to prevent exportation, and by wounding officers of the customs. All monies recovered against the hundred to be levied by a rate.

HUNGARY WATER, denominated from a queen of Hungary, is made by distilling in balneo, fresh gathered flowers of rosemary two pounds, rectified spirits of wine two quarts.

HURA, in botany, a genus of the monoecia monadelphia class and order. Natural order of tricoccæ. Euphorbiæ, Jussieu. Character: male, ament imbricated; perianth truncated; corolla none; filaments cylindrical, peltate at the tip, surrounded by very many anthers in pairs; female, calyx and corolla none; style funnel-form; stigma twelve-cleft; capsule twelve-celled; seed one. There is one species, viz. H. crepitans, sand-box tree. It is about twenty-four feet in height, dividing into many branches, which abound with a milky juice. The fruit is very curious in its structure, and the trees sometimes casts a shade forty feet in diameter; from the quickness of its vegetation, its parts are of so loose a texture, that a loud clap of thunder, or a sudden gust of wind, frequently causes the largest boughs to snap asunder; the trunk is of little use, except for fire-wood.

of the sun, great stillness, and at the same time turbulence of the skies, swelling of the sea, the like happening at the change of the moon, the natives conclude there will be a hurricane next full-moon; and if the same signs be observed on the full moon, they expect one next new moon. As the wind betwixt the tropics is generally easterly, and upon the sun's going back from the northern tropic, the western winds pour down with violence upon those parts, the opposition of these contrary winds cannot fail to produce a hurricane. Hurricanes shift not through all the points of the compass, but begin always with a north wind, veer to the east, and then cease; and their shifting between these two points is so sudden and violent, that it is impossible for any ship to veer with it.

HUSBAND and WIFE, usually termed *baron* and *feme*, are one person in law; that is, the very being or legal existence of the woman is suspended during the marriage; or, at least, is incorporated and consolidated into that of the husband. A man cannot grant lands to his wife during the coverture, but he may, by his deed, covenant with others for her use, and he may give to her, by devise or will. All deeds executed and acts done by the wife during her coverture, are void; except a fine, or the like matter of record, in which case, she must be solely and secretly examined, that it may be known whether or not her act be voluntary. A wife shall not suffer any punishment for committing a bare theft, in company with, and by coercion of her husband. A husband may restrain a wife of her liberty, in case of any gross misbehaviour; but if he threaten to kill her, &c. she may make him find surety of the peace. The husband, by marriage, obtains a freehold in right of his wife and may make lease thereof for twenty-one years, or three lives. The husband also gains a chattel real, as a term for

the animals reared by
bour.

On Inclosing and
of lands must be con
foundation of all imp
ing of lands is the ne
them productive, as
of water is no less in
than the absolute wa
one of the most impo
farmer to prevent i
quences. For this
ble drains are in
while in others, hol
in covered trenches
width and depth of
regulated by the va
tion to which they
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they must at top be
they are at bottom
tion must obviousl
should at the same
All open drains s
least, once in every

Hollow draining
sired effect only wh
mits the passage of
The depth of the dr
of the land should g
ty-six inches to thir
secured from rece
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to form a triangle,
the drain forms th
must be executed
care; and with res
which they should
deep, if stones are
should be applied
faggot-wood, hor
and even turf, laid
used in different
thorn, however, h
as answering bett
terials.

Fences.—Every a

ces may be composed of
t proper method of re-
s by plashing.
y this practice, in mild
s produced in extreme
n so early as March. The
hich it depends have no
plexity. Water will ea-
level of the receptacle
is derived. All streams
greater or less degree,
may be taken from a ri-
convey water over the
e of that river to a consi-
e below the head of the
e river from which it is
tly below it. As water,
t to stagnate upon land,
siderable injury, it is re-
ain, before it be introduced
, that it can be easily and
ned off.
s-ses over fossil chalks, or
calcareous nature, will
the process of vegetation.
run a long way, is almost
ble to what flows over land
rom the spring. In mid
tention should be applied
tered land sheltered by the
rigour of night frosts; but
hole winter it should be
ce in every twelve days,
otting the roots of the grass.
should also be attentively
reserve the equal distri-
ater over it. In the month
articular caution is requi-
ater remain many days to-
e land, a white scum, ex-
cious, is the consequence;
l be exposed, without dry-
day, to one severe night
age will often be complete-

summer. The best grain for the first crop after marl is oats.

Gypsum, or plaister of Paris, is commonly used in Switzerland and North America as a manure. In Cornwall, and other counties, sea sand is laid upon the land in considerable quantities and found extremely useful in softening stiff clays, and rendering them pervious to the roots of plants. Chalk or powdered limestone, will also answer this important end.

The true nourishment of vegetables consists of water, coal, salts, and different kinds of earth, which are ascertained to be the only substances common to vegetables and the soils in which they grow. In favourable weather, grasses and corn absorb and perspire nearly half their weight of water every day. The great problem with respect to manuring or fertilizing a soil, appears to be, how to render coal soluble in water for the purposes of vegetation, and to discover that composition of the different earths which is best adapted to detain the due proportion of moisture. With respect to the former, the fermentation of dung appears to be the best method hitherto discovered. Clay soils, being defective in constitution and texture, want the calcareous ingredient and coarse sand. Marl and dung are still more beneficial, as dung supplies the carbonaceous principle. For clayey loam, if deficient in the calcareous ingredient, chalk is an excellent manure; if in the sandy ingredient, sand is the obvious and easy remedy; a deficiency in both will be best supplied by siliceous marl, limestone gravel, or effete lime with sand. The most effectual application for the chalky soils, which want both the argillaceous and the sandy ingredients, is clayey or sandy loams. For chalky loam, the best manure is clay. Calcareous marl is the best manure for tures. The draining from the yard should never run to waste. If the dung remains under water, putrefaction is stopped: this therefore should be guarded against.

The dung raised even by a few sheep in a standing fold, under a shed constructed expressly for the purpose, is a considerable object. Animal substances are very far preferable as manures to fossil or vegetable ones. With regard to the dung of animals, that of sheep is unquestionably the best. That of horses fed upon corn and hay is justly preferred to that of fatting cattle, which, however, is greatly superior to that of lean cattle, and particularly of cows, though they may feed upon turnips.

The practice of paring and burning is of the most decided advantage in the preparation of land. It is safe on any soil, and in some it is essentially necessary. That which most requires it, is what consists of moss, rushes, and all kinds of coarse grass. It should be exercised on moor and heath-field, on account of the roots of the grass remaining in it, which are very stubborn and durable, and which check the growth of corn, turnips and other vegetables, by depriving them of a certain portion of nourishment. The ashes procured by paring and burning will furnish manure for several crops. When the ashes are spread, the land, as is usually the case, should be thinly ploughed.

The culture of grasses.—A close and sound turf may be considered as the best manure yet discovered. Excellent grass lands therefore are valuable, not only directly, for the food of cattle, but indirectly as containing ample means of raising grain, never failing, upon being broken up, to produce for a time a succession of valuable crops, whether of grain or roots. Grass lands, designed to be cut for hay, are to be distinguished from those on which the herbage is intended to be consumed by cattle upon the spot. In fields of the latter kind, properly called pasture,

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To prepare
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seeds in August.
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The chief fo
grasses, the dist

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as should all small seeds.
ddle of April to that of May,
season for sowing. Although
ree years if cut down green,
urse is to let it stand but one.
t upon a rich soil, whether
, or gravel, and will grow
moor. For a wet soil it is

lay down land permanently
best depend on white, or
for all rich and dry loams
nd for rich clays that have
y drained.
will flourish on any land but
is well adapted for perma-
It is one of the best spring
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ns than any other.
preferred by many to clover,
o injure cattle when they eat
ducing larger crops, making
d continuing four times lon-
und. The quantity of milk
eans of it from cows is near-
what is produced by any
od. It is much cultivated
s, and succeeds best where
deep. Cold and wet clay is
it, and the dryness of land
consequence to its growth
richness of it. It is best cul-
drill husbandry, after re-
ing, harrowing, and rolling.
uld be sowed about an inch
tter end of March.
mains at least above twelve
ng very large crops, and
most excellent hay, to the
bout seven tons per acre.
be kept open and free from
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the tap root be cut off. The
ion for it is a turnip or cab-
o manure should be allowed
ng till the crop is two years
oving effect upon the soil is
rst.
a grass peculiarly adapt-
ed, and is so hardy, as to
all other vegetation fails.
n in the beginning of July.
pleasant milk, and in great
moist loams and clays, there
etter grass than meadow fox-

n with soils, the principal
ave been thus arranged. *Clay.*
ck's-foot, dog's-tail, fescue,
ass, trefoil, york white, timo-
White clover, rye, york white,
l, dog's tail, pea, timothy,
e.—*Sand.* White clover, rye,
arrow, burnet, trefoil, rib.
w, burnet, trefoil, white clo-
—*Peat.* White clover, dog's-
t, rib, york white, rye, fox-
mothy.
and operations of Husban-
truments used in husbandry
ous, and, under the same de-
ften so differently construc-
ew so varieties of the same
the limits of this work will
f detailing their structure
n. In the process for which
ctively intended, every far-
mer will of course avail himself of those, the utility of which is best decided by experience, and which are best suited to the quality of his land.

Ploughing.—In almost all lands there is a fixed depth for the plough to go, which is the stratum between fertile and unfertile moulds. No soil should be ploughed beyond this bottom, or sole. In fallowing land, therefore, the plough may go as deep as the fertile soil will allow, and breaking up land without paring and burning. When land is pared and burnt, it ought to be ploughed in small furrows, and not so deep, as this depth of furrow would hazard the loss of the ashes for the immediate and indeed for the subsequent crops.

Instead of ploughing stubble into the land, it is far better to mow it, and even to harrow the land before it is fallowed. In a soil of a poor quality, a certain proportion should be observed between the depth of ploughing, and the quantity of manure usually spread. A ploughing before harvest is of extreme consequence in fallowing. When fallows are called for, they should be attended with an observant eye, and be kept clean, whatever other business may press upon the husbandman's attention.

Harrowing is not only necessary for covering the seed, but also preparing the land for its reception. The harrow should be so constructed that no tooth can follow the track of another. The practice is best performed by harrowing a square piece of land at once, so that the instrument may be lifted at the corner, and the refuse stuff left there.

The utility of rolling consists in rendering a loose soil more compact and solid, which, by making the earth adhere to the roots of plants, cherishes their growth. No roller that can be drawn by two or even by four horses will carry this effect too far. By rolling, moreover, the moisture of the earth is kept more in, and in a dry season, this circumstance sometimes constitutes the difference between a good and a bad crop. The common practice of breaking clods by means of mallets may be superseded by the roller, preceded for a day or two by harrowing.

The practice of scarifying grass lands is used by a variety of persons, and is directly opposite to that of rolling them in its principle and effect. For this purpose a plough, consisting only of coulters, or narrow teeth, is employed; and it is asserted, that the crops of hay are considerably increased by the loosening of the earth occasioned by this process, the roots acquiring the power of fresh vegetation. The operation may undoubtedly be beneficial in various instances and soils. The use of the roller, however, upon grass lands of a certain description will be admitted to be preferable.

Drill Husbandry.—The objects of this husbandry are the promotion of the growth of plants by hoeing, and the saving of seed.

The land having been brought into good tilth by the old method, it should be so thinly sown as to leave sufficient room for the plants to extend themselves. It must be divided for this purpose into rows, 20 inches distant from each other.

earth before thrown towards the rows of wheat. This should be performed immediately after harvest, that, before the rows are sowed, there may be time for slightly stirring the land. The banishment of the plough in spring, to as great a degree as possible, has taken place, in consequence of this most useful and happy innovation. All peas and beans, barley and oats may be put in on an autumnal ploughing. By the winter frosts a friability is given to the surface of the soil, so great, that very early in the spring after one scarifying and harrowing, the corn may be drilled, and without a horse foot treading any where but in the stich furrows, where it can do no injury.

From a comparative estimate of the profits attending the different modes of husbandry, it appears that the advantage is greatly with the modern system. The ground may be ploughed dry, and may be drilled wet. The seed is planted at the precisely proper depth, and has all the advantage of early sowing. The land also is much less exhausted by this method the weeds being completely destroyed by the hoe. With regard to white crops however, many farmers of liberality and sense reject this practice, although with respect to potatoes, cabbages, beans, and often turnips also, it is admitted by them to be unexceptionable. On a soil, however, in which the drill-machine can move with freedom, there appears no reason, and it may be almost said, no excuse, for the rejection of the modern system.

The culture of grain and roots.—Of the various plants raised for the nourishment of man, wheat is of the chief importance. To prevent the disease so fatal to this vegetable, called the smut, steeping its seed for from twelve to twenty-four hours in a ley of wood ashes, in lime water, and in a solution of arsenic, is completely efficacious. On cold, wet, and backward soils the best season for putting this grain into the earth is September, particularly if the

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Peas are extreme
soil, and may there
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eserve from the *farmer* every at- When cultivated, with a view tuting them in the room of fallow, or dibbling must be uniformly ed, so as to admit the plough be- their rows. The common little ean has the advantage of being arketable than any other. Beans upon light loams better than has nerally imagined. The soils, how- enerally applied to their culture, the strong and heavy ones. They exhaust the soil, and wheat is pre- or by them, perhaps, better than other mode. The quantity of iffers according to the variety of ns. About two bushels of the horse per acre, in rows equidistant, at en inches, is a proper allowance, ebruary is the month in which they be put in.

wheat has numerous excellencies, n enriching nature, and prepares r wheat, or any other crop. One of seed is sufficient to sow an acre. nd of May is the proper season for its sown, or even buck-wheat may wn so late as the first week in

toes form a most important article , both for the human species and tle. The choice of soil for the cul- this root is of prime importance. s never make palatable nourish- or man if grown in a clay soil, or k black loam, although in these stances they are well fitted for They grow to perfection for hu- ood in gravelly and sandy soils. il should be universally preferred r cultivation. In September, or r, the field should have succes- rousing furrow, a cross braking, operation of the cleaning harrow; formed into three-feet ridges, remain in that state till April, the proper season for planting ot. After cross-braking them, to a small degree the furrows, well- horse-dung should be laid along n which the roots should be laid inches distance. The plough then pass once round every row, them. As soon as they appear round, the ploughs should be pass- d them a second time, laying on nis about an inch, or somewhat f mould, in addition. When they tained the height of six inches, the should go twice along the middle interval, in opposite directions, ach first to one row, and then to r; and, to apply it more closely to ots, a spade should afterwards be cover four inches of the plants, ry all the weeds. The weeds rise afterwards must be extirpated hand, as the hoes would go too nd damage the roots of the plants. n to fifteen bushels will be suffi- to plant an acre, the produce of may probably be three hundred s. Sets should be cut with at least to each, and not in very small and the depredations of the grub hem may be effectually prevented ering on the surface of the land wo bushels per acre of lime fresh slaked. The most certain method of taking them up, is to plough once round every row, at the distance of four inches, after which they may easily be raised, by a three-clawed fork. They may with care be preserved till the ensuing crop, particularly by the allowance necessary till April being closely covered in the barn with dry and pressed down straw, while the remainder for the ensuing part of the year is buried in a dry cave, mixed with the husks of dried oats, sand, or leaves, especially if a hay or corn-stack is erected over it. Potatoes are subject to a disease called the curl. The methods most successfully exercised for the prevention of it, are, to cut the sets from the smooth, ripe potatoes, of the middle size, which have been kept particularly dry, to guard against the rubbing off the first shoots, and to plant them rather deeply in fresh earth with a mixture of quick lime.

No plant thrives better even in the coldest part of this island than the turnip, and none is more advantageous to the soil. There is no soil which will not produce it, when previously prepared for it by art; but the gravelly one is best of all adapted to it. No root requires a finer mould, and with a view to this object the land intended for it should be exposed to frost by ribbing it after the harvest. The season for sowing must be regulated by the time intended for feeding, the later from the first of June to the end of July. The field should be first ploughed by a shallow furrow. Lime, if necessary, should be then harrowed into it. Single furrows, at the interval of three feet, should be drawn, and dung laid in them, which should be then covered by going round it with the plough, and forming the three-feet spaces into ridges. Thick sowing is far better than thin, bearing better the depredations of the fly, and forming also a protection against drought. The weeds may be extirpated by women, and the standing turnips should be left at twelve inches distance from each other. On average seasons, the produce from this number per acre may be considered as amounting to 46 tons. For preservation they may be stacked with straw. Some sow late crops, even in August, by which a succession of them remains on the field to be consumed on the spot, even so late as the ensuing May. To prevent the devastations of the fly, sow the seed at such a season that they may be well grown before the appearance of the insect; and by well dunging and manuring the ground hasten their attainment of the rough leaf in which the fly does not at all affect them.

The cabbage is subject to few diseases, and resists frost more easily than the turnip. It is palatable to cattle, and sooner fills them than carrots or potatoes. On all soils they require manure, and the produce per acre is from 50 to 60 tons. If for feeding in November, plants, procured from seed sown in the end of July in the former year, must be set in March or April; if for feeding in March, April, and May, they must be set in the beginning of the preceding July, from seed sown in the previous February. Repeated transplantation may be applied to ploughing. Loams and sandy soils are the only ones in which they will flourish and no dung can be used for them in the year they are sown, as it will inevitably rot them. The ground must be prepared by the deepest possible furrows, and when they are sown, about the beginning of April, it must be smoothed by a brake. From six to nine hundred bushels, have been produced per acre. For horses, oxen, milch cows and pigs, carrots are admirably applicable and nourishing, and, when boiled, turkeys and other poultry are fed on them with great success.

Parsnips are cultivated with great ease and contain a great quantity of nutritious matter. Cows which are fed with them give as much milk as they do in the months of summer. All animals eat them with avidity, and in preference to potatoes, and fatten more quickly upon them. The seed should be sown in the autumn in drills, at the distance of eighteen inches, for the greater convenience of hoeing; and by a second hoeing and a cautious earthing, by which the leaves may not be covered, the crop will be luxuriant.

Hemp requires and delights in a rich, deep, putrid, and friable loam; and in addition to natural richness, forty cubical yards of dung per acre should be applied. About twelve pecks should be sown per acre. It will be ready for pulling in August, or about thirteen weeks after it is sown.

Two bushels of flax seed are required per acre, and the land, if it be not particularly rich by nature, must be rendered so by art, must be worked to a fine surface, and be kept perfectly free from weeds.

The preparation for rape-seed is the same which is necessary for that of turnips. It is a crop subject to great injury, and extremely uncertain.

That rotation is admitted to be the best which enriches the land with abundant

barley, clover,
peas, wheat—*Lig*
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grass, clover and
or rye.

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hastening the process of fattening an ox, linseed cake has been found superior to every other article. Carrots complete the fattening in a nearly equal degree [illegible], and an ox will eat a sixth part of his weight of these roots every day. Turnips do not possess the same fattening quality. Of these the consumption of 25 ton is deemed necessary to fatten a beast of about 60 stone. In consequence of eating succulent plants, and particularly clover, beasts are apt to swell greatly and very dangerously, in which case, driving them about with great rapidity is often practised with success, though a still more effectual method is to stab them between the ribs and hip-bone to the depth of about four inches. A flexible tube has also been frequently passed through the mouth into the gullet, by which the air, which causes this disease, is easily discharged. The practice of stall-feeding, or keeping the cattle in the house at every season of the year, and feeding them with green food, where there is abundant litter, is considered as the best method of turning to account the produce of the soil. Not only may grass be thus employed for food more profitably than in any other way, but boiled roots may be used with extreme advantage. Cleanness and temperate warmth in the process of fattening beasts for human food are of the utmost importance, and whatever tends to form in beasts a state of feeling unirritated by fear, vexation, or pain, shortens the period necessary for advancing them to their maturity of size and excellence.

Sheep.—The new Leicester have the advantage in competition with all the long-wooled breeds, and the South Down with all those of short or middling are permitted to run over the clover and pastures of the farm, committing great waste and damage. To prevent these evils, burnet should be cultivated by the farmer. It is a most hardy plant, and preserves its green leaves through the winter. But kept grass on dry meadow and pasture, or what is called roneo, is preferable to every other dependence.

In June the washing of the sheep should generally take place, previously to the shearing. The washing may be best performed by a stream of water; the shearing, which speedily follows this operation should be as close as possible, and the circular is by far preferable to the longitudinal method with a view to this object.

Sheep that are kept in inclosures, and particularly in a woodland country, should be examined twice every day, to guard against injury to them from the fly. The most efficacious treatment is, after picking out the maggots with a knife, to scrape a small quantity of white lead among the wool, so that it may be carried evenly down to the wound. When ewes are about to lamb, their keep should be of the most nourishing kind, consisting of plenty of turnips or cabbage. A standing rack of hay should likewise be left for them on the field.

Swine.—The quick multiplication and growth of swine render them a species of stock highly profitable. Their styes should be constructed sloping, to carry off all moisture. The different sorts of swine should be kept separate in them. The large Chinese breed is generally and justly preferred. When swine are reared on a comprehensive plan, crops must be sown purposely for their support. Potatoes, carrots, cabbages, and the Swedish turnip, must be provided for them from October till the end of May, when they may be received into lucerne, chicory, or clover, on which they will be maintained

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every two days. Cow
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draw the milk from

ual masses. Texture foliate.
wen, inclining to conchoidal;
paque; colour pure white.
deg. Wedgewood, but it yields

, See *Phalæna*.
CULUM, that part of the
defends the embryo plant
s during winter.
ES, little transparent blad-
water, sometimes found soli-
ometimes in clusters, upon
d various other parts, especi-
pical constitutions.
, a genus of the natural order
e cryptogamia class of plants.
e under side. There are six
e imbricatum is found in the
tain. It has a convex hat,
g on a smooth pillar, of a
our, with white prickles.
n astronomy, a southern con-
gined to represent a water-
e number of stars in it in
Catalogue, is sixty eight.
olypes, in natural history, a
vermes zoophyta class and
al fixing itself by the base,
ous, naked, contractile, and
h setaceous feelers; inhabit-
ters, and producing its de-
ring or eggs from the sides.
e species.
NA, a genus of insects of
optera. Head, thorax, and
ted; two feelers, jointed;
six eyes; eight legs, ciliate
for swimming. There are
species, inhabitants of the
eographica is reckoned one
beautiful of the British

EA, in botany, a genus of
digynia class and order.
of succulentæ. Saxifragæ.

fore the mean distance between the surface and the vent will be found, in general, a correct standard. Hence, in order to force double the quantity of water through the lowest of two apertures, the distance must be quadruped. For if a hole made at C in the pipe A D, fig 1, will supply one gallon of water in a minute; to draw double that quantity in the same time, the lower hole, D, must measure from the surface, B, four times as much as from C to the surface. This establishes the above position, and proves besides, that the force is equal to the velocity. To shew this, let the pipe, A B, be perforated in several parts, as at C D E; the first, i. e. C, being one foot; that at D being four feet; and that at E being seven feet below the surface, B; between E and A we will suppose only one foot interval, so that D may be in the centre of the height, A B. Draw the horizontal line, A F, and from D describe the semi circle, B G A, having D G equal to D A, or D B, for its radius. Now the water will, as it flows from D, describe a parabola, and will fall upon the line A. F, at such a distance from A, as will be equal to double the radius, D G. In like manner the water flowing from the aperture, C, will reach that point, viz. K, on the horizontal A. F, which may measure double the sine, C H. on the same semicircle: and the sine of the arc taken opposite to E, i. e. E L, is equal to the sine, CH, the water rushing from E will intersect or meet the water falling from C, at the point K. It is to be observed, that the parabolic curve of the water proceeding from C to K, has a greater tendency to gravitation than that issuing from E, which rushes with far more force, and consequently has a greater tendency to an horizontal direction. For the aperture of C is only acted upon by a column lastic nature of water causes it to retain its surface perfectly level. To prove this, let a piece of wood be put into a pail of water, the fluid will in every part remain equally dense, and the surface will be perfectly level.

Where water is enclosed within a vessel, or in a tube, in such manner that air cannot penetrate, it will not flow out in the same manner as if air were admitted to supply the place of any quantity that might be required to be drawn off. For although all fluids have a direct disposition to gravitation, they are perfectly inelastic. Of this property advantage has been taken to draw off liquors from one vessel to another, by means of an instrument, called a syphon. This is a pipe of tin, copper, &c. bent at any angle, but generally about 70 to 80 deg. in such manner that one limb may reach down through the bung-hole of the cask to be emptied, to its very bottom; the other leg should be the longest, so that when filled it may contain a heavier body of fluid than the limb within the vessel. See fig. 3, where the syphon A B C, is inserted into a vessel to be emptied. In large syphons it is necessary to insert a cock at the lower end to prevent the escape of the fluid when first filled. In small syphons it is common to put a small parallel tube, which being applied to the mouth, the end, C, being immersed in the liquor to be drawn off, the operator inhales forcibly, and by this drawing the air out of the syphon, causes the liquor to rise in its place. The absence of air, which first caused the fluid to ascend into the tube, occasions it to remain until the finger is removed from the end, A; when the pressure of the air within the vessel causes the liquor to press through the syphon, which continues to the last to draw off the contents of the vessel, they pressing forward through the long end, A.

A comical display of the properties of the syphon is seen in what is called "The

t the pentandria digy-
ler. Natural order of
bel simple, with a four-
; petals entire; seeds
ompressed. There are

MICS, treat of the pow-
locities, of fluids in mo-

It had been long known
that a vapour or air
during the solution
, in muriatic or dilute
at it burnt at the mouth
mixed with atmospheric
en kindled by a match.
rming water when com-
n, and being therefore
t compound, the name
en to it at the formation
nclature. It is always
decomposition of wa-
from other substances
s, be easily disengaged
. Some substance is
water, which exerts an
xygen, without combin-
gen, when of course the
gaged, and passes into
If a coil of iron wire, or
filings be put into an
lass, or earthen tube,
across a small furnace,
with burning fuel, so as
red heat, on distilling
t connected with it, the
ng over the surface of
decomposed, the iron
en, and hydrogen gas
remity of the tube.
troublesome one, and
n acid, water is decom-
y iron or zinc, at a natu-
Zinc affords the hydro-

atmospheric air, and a burning body approached to the mixture, or an electric spark sent through it, it instantly inflames with detonation; and when it has been mixed with oxygen gas, the detonation is more violent. Though hydrogen gas be inflammable, it is incapable of supporting the combustion of other inflammables. This gas is incapable of supporting animal life by respiration; an animal immersed in it is soon killed. At the same time, it does not appear to be so positively deleterious as the other noxious gases. Rosier even after expelling the air from the lungs, breathed hydrogen gas for several respirations. It is not noxious to vegetable life; at the same time, it appears to contribute little to the nourishment of plants.

Hydrogen gas is so sparingly soluble in water, that when agitated with it, it suffers no perceptible diminution of volume. The affinities of hydrogen seem principally exerted towards inflammable bodies. Hydrogen gas is found collected often in mines, derived probably from the decomposition of water by metals; it is known to the miners by the name of fire-damp, and is often the cause of accidents from exploding on the approach of an ignited body. It is also extricated from stagnant water, and from marshy situations, from the slow decomposition of vegetable and animal substances. From its levity it has been supposed that the quantity of it thus produced at the surface of the earth, will rise through the atmosphere and occupy the higher regions; and on its presence, some of the phenomena of meteorology, particularly the sudden appearance of some fiery meteors, have been supposed to depend.

HYDROGRAPHY, the art of measuring and describing the sea, rivers, lakes, and other fluids, are by this means weighed to a great degree of accuracy, care being taken to keep the temperature as equal as possible, by avoiding any contact of the bottle with the hand or otherwise. The bottle itself shows, with much precision, by a rise or fall of the liquid in the notch of the stopper, whether any such change has taken place.

But as the operation of weighing requires considerable attention and steadiness, and also a good balance, the floating instrument called the hydrometer, has always been esteemed by philosophers as well as men of business. It consists of a hollow ball, either of metal or glass, capable of floating in any known liquid; from the one side of the ball proceeds a stem, terminating in a weight, and from the side diametrically opposite proceeds another stem. The weight is so proportioned that the instrument may float with the last-mentioned stem upright. In the less accurate *hydrometer* this stem is graduated, and serves to show the density of the fluid, by the depth to which sinks; as the heavier fluids will buoy up the instrument more than such as are lighter.

The hydrometer of Fahrenheit is more accurate. It consists of a hollow ball, with a counterpoise below, and a very slender stem above, terminating in a small dish. The middle or half length of the stem, is distinguished by a fine line across. In this instrument every division of the stem is rejected, and it is immersed in all experiments to the middle of the stem, by placing proper weights in the little dish above. Then as the part immersed is constantly of the same magnitude, and the whole weight of the hydrometer is known, this last weight, added to the weight of the dish, will be equal to the weight of fluid displaced by the instrument. Consequently as the whole weight of the hydrometer and its load, when adjusted in distilled water, is to the [illegible] &c. so is the whole weight, [illegible] in any other fluid, to the number [illegible] sing its specific gravity.

As a considerable number of [illegible] philosophers refer to the [illegible] Baume, it will be of use to explain [illegible] principles. As thermometers are graduated, independent of each other, [illegible] commencing with an interval [illegible] two stationary points of temperature, [illegible] M. Baume adopted two [illegible] sities, for the sake of marking [illegible] on the stem of his hydrometer. The densities were those of pure [illegible] of water containing [illegible] parts [illegible] of pure dry common salt [illegible] The temperature was [illegible] mur above freezing, or [illegible] renheit. His instrument [illegible] so balanced, as nearly to sink in pure water. When it was plunged in the [illegible] solution, the stem rose [illegible] surface. The elevated point [illegible] sumed to be fifteen degrees, [illegible] vided the rest of the stem [illegible] compasses into similar degrees.

One of the principal uses [illegible] meter in common life is [illegible] specific gravity of mixtures [illegible] with water, and thence to find [illegible] each is contained in any mixture [illegible] tures of alcohol with water. [illegible] ing tables will show the

Real Specific Gravities of Spirits at different Temperatures.

Heat.	The pure spirit.	100 grains of spirit to 5gr. of water.	100 gr. of spirit to 10 gr. of water.	100 gr. of spirit to 15 gr. of water.	100 gr. of spirit to 20 gr. of water	100 gr. of spirit to 25 gr. of water	100 gr. of spirit to 30 gr. of water	100 gr. of spirit to 35 gr. of water	[illegible]	[illegible]	[illegible]
30°	.83896	.84995	.85957	.86825	.87585	.88282	.88921	[illegible]	[illegible]	[illegible]	[illegible]
35	83672	84769	85729	86587	87357	88059	88701	[illegible]	[illegible]	[illegible]	[illegible]
40	83445	84539	85507	86361	87134	87838	88481	[illegible]	[illegible]	[illegible]	[illegible]
45	83214	84310	85277	86131	86905	87613	88255	[illegible]	[illegible]	[illegible]	[illegible]
50	82977	84076	85042	[illegible]	86676	87384	88030	[illegible]	[illegible]	[illegible]	[illegible]
55	82736	83834	84802	85664	86441	87150	87796	[illegible]	[illegible]	[illegible]	[illegible]
60	82500	83599	84568	85430	86208	86918	87569	88169	[illegible]	[illegible]	[illegible]
65	82262	83362	84334	85193	85970	86686	87337	[illegible]	[illegible]	[illegible]	[illegible]
70	82023	83124	84092	84951	85736	86451	87105	[illegible]	[illegible]	[illegible]	[illegible]
75	81780	82878	83851	84710	85496	86212	86864	[illegible]	[illegible]	[illegible]	[illegible]
80	81530	82631	83603	84467	85248	85966	86622	[illegible]	[illegible]	[illegible]	[illegible]
85	81291	82396	83371	84243	85016	85737	86411	[illegible]	[illegible]	[illegible]	[illegible]
90	81044	82150	83126	84001	84797	85518	86172	[illegible]	[illegible]	[illegible]	[illegible]
95	80794	81900	82877	83753	84550	85272	85928	[illegible]	[illegible]	[illegible]	[illegible]
100	80540	81657	82639	83513	84308	85031	85688	[illegible]	[illegible]	[illegible]	[illegible]

.92217	.92563	.92889	.93191	.93474	.93741	.93991	.94222
92009	92355	92680	92986	93274	93541	93790	94025
91799	92151	92476	92783	93072	93341	93592	93827
91584	91937	92264	92570	92859	93131	93382	93621
91370	91722	92051	92358	92647	92919	93177	93419
91144	91502	91837	92145	92436	92707	92963	93208
90927	91287	91622	91933	92225	92499	92758	93002
90707	91066	91400	91715	92010	92283	92546	92794
90484	90847	91181	91493	91793	92069	92333	92580
90252	90617	90952	91270	91569	91849	92111	92364
90021	90385	90723	91046	91340	91622	91891	92142
89843	90209	90558	90882	91186	91465	91729	91969
89617	89988	90342	90668	90967	91248	91511	91751
89390	89763	90119	90443	90747	91029	91290	91531
89158	89536	89889	90215	90522	90805	91066	91310

85 gr. of spirit to 100 gr. of water	80 gr. of spirit to 100 gr. of water	75 gr. of spirit to 100 gr. of water	70 gr. of spirit to 100 gr. of water	65 gr. of spirit to 100 gr. of water	60 gr. of spirit to 100 gr. of water	55 gr. of spirit to 100 gr. of water	50 gr. of spirit to 100 gr. of water
.94920	.95173	.95429	.95681	.95944	.96209	.96470	.96719
94734	94988	95246	95502	95772	96048	96315	96579
94547	94802	95060	95328	95602	95879	96159	96434
94348	94605	94871	95143	95423	95705	95993	96280
94149	94414	94683	94958	95243	95534	95831	96126
93948	94213	94486	94767	95057	95357	95662	95966
93749	94018	94296	94579	94876	95181	95493	95804
93546	93822	94099	94388	94689	95000	95318	95635
93337	93616	93898	94194	94500	94813	95139	95469
93132	93413	93695	93989	94301	94623	94957	95292
92917	93201	93488	93785	94102	94431	94768	95111

40 gr. of	35 gr. of	30 gr. of	25 gr. of	20 gr. of	15 gr. of	10 gr. of	5 gr. of

HYDROPHILUS, in natural history, a genus of insects of the order coleoptera. Antennæ clavate, club perfoliate; feelers four, filiform; the hind-legs formed for swimming, fringed on the inner side. The insects of this genus inhabit ponds and stagnant waters, where they swim with much dexterity; they fly abroad by night in search of other waters. The males are distinguished by having a horny concave flap on the fore legs, near the setting on of the feet. The larvæ remain about two years and a half before they change into pupæ, forming a convenient cell, and secreting themselves in some bank. They are very voracious, and destructive to the more tender aquatic insects, worms, and young fish. There are upwards of 30 species. The principal European species is the H. piceus, water-clock. The female of this species spins a kind of web, or flattish circular case of silk, which it leaves floating on the water, and in which it deposits its eggs. This case is terminated on its upper surface by a lengthened conical process, resembling a horn, of a brown colour, and of a much stronger nature than the case itself, which is white. The larvæ, as soon as hatched, make their escape from the envelopment of the case, and commit themselves to the water.

HYDROPHOBIA, an aversion or dread of water; a terrible symptom of the rabies canina.

HYDROPHYLAX, in botany, a genus of the tetandria monogynia class and order. Natural order of Rubiaceæ, Jussieu. Calyx four-parted; corolla funnel-form; fruit ancipital, one-seeded. There is one species.

HYDROPHYLLUM, in botany, *water-leaf*, a genus of the pentandria monogynia class and order. Natural order of aborogineæ, Jussieu. Corolla bell-shaped, with five longitudinal melliferous streaks on the inside; stigma bifid; capsule globular, two-valved. There are two species.

HYDROSCOPE, an instrument anciently used for the measuring of time. The hydroscope was a kind of water-clock, consisting of a graduated cylindrical tube, conical at bottom, or marked out with divisions, to which the top of the water becoming successively contiguous as it trickled out at the vortex of the cone, pointed out the hour.

HYDROSTATICAL *balance*, a kind of balance contrived for the easy and exact finding the specific gravities of bodies, both liquid and solid. See *Hydrostatics*.

HYDROSTATICS relate to the resting equilibrium of non-elastic fluids; and to the pressure of solids immersed therein. A fluid is a body whose parts are infinitely minute, capable of dislocation in consequence of the smallest force, invariably (when suffered to rest) resuming a perfect level surface, and presenting an equal resistance throughout every part to the body immersed. Fluids may be divided into two classes, viz. the elastic, such as air, vapour, and gas; all which may be compressed more or less: and the inelastic, viz. water, mercury, spirits, &c. which cannot be compressed; though by being heated they distend considerably.

We shall commence the
to this subject, with an
method of obtaining the
ties of bodies; that is,
comparative weights of
and fluids. This is ordi
means of the hydrostatic
ingenious device for exac
the weight, either immers
or the air: the constru
requires peculiar nicety;
appended to any comm
will be understood from
description. Each scale
small hook fixed to the ce
tom; to these small weigh
tached by means of hors
silk, thence to suspend a
without wetting the scale
the body in the usual m
scales, with great exactne
in water, and the equilibri
stantly destroyed. To resto
the scale from which the bo
in the water is suspende
weight as will bring it e
other scale in which the op
remains unaltered. The
will be equal to that of a q
ter equalling the immersed
Now, if the weight of the bo
divided by what it weighed
the quotient will shew how
body is heavier than its bulk

Here, however, it is nece
serve, that the density of w
greatly according to its tempe
does not afford a regular sc
or of bulk in proportion to th
heat; as will appear from th
table:

Deg. of Heat.	Bulk of Rain Water.
30deg.	
35	99910
40	99070
45	99914
50	99932
55	99962
60	100000
65	100050
70	100106
75	100171
80	100242
85	100320
90	100404
95	100501
100	100602

The following general rules
the specific gravity will be
1." When the body is heavier th
Weigh it both in water, and
mosphere, and the difference
the results will shew the quan
the former mode; then, as the
in water, is to the weight in ai
gravity of water to the grav
body. 2. " When the body w
in water." Render the bo
enough to sink by means of so
dage, as a small piece of
weigh the body and the uppe

HYDRAULICS, &c.

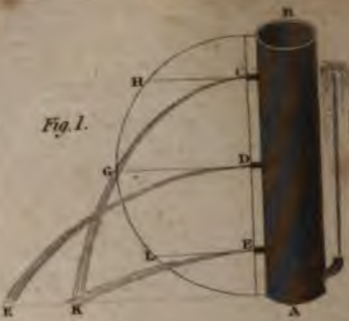
Fig. 1.

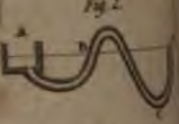
Fig. 2.

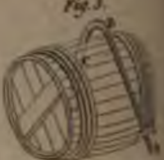
Fig. 3.

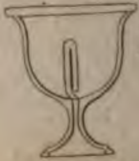
Fig. 4.

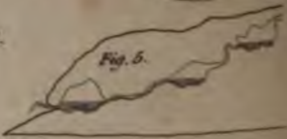
Fig. 5.

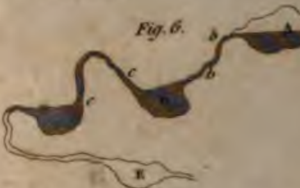
Fig. 6.

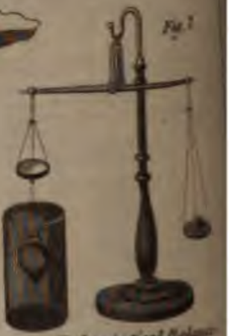
Fig. 7

Hydrostatical Balan

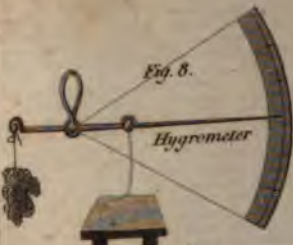
Fig. 8.

Hygrometer

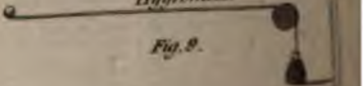
Hygrometer

Fig. 9.

Coope

Published Jan.y 1, 1820, by R. Phillips, Bridge Street, Blackfriars, London.

together, in the air, and in
d out how much each loses
and substract those losses
ole weight of each in air.
last remainder is to the
light body in air; so is the
er to the gravity of the bo-
en a fluid is to be weighed."
id in a cup, which is to be
ppendage, and treated ac-
foregoing rule, observing,
hole weight is to the loss of
the gravity of the solid to
the fluid.
the respective weights of
ngredients in a given com-
the differences of every
ree specific gravities; (viz.
ravities of the compound,
ingredient): multiply each
the difference of the other
the greatest product is to
ght of the compound; so is
her two products to each
eight of the two ingredients.
d with water weigh more
empty; to prove this let a
ded so as to sink in a pail of
nough for the water to co-
; which should be previous-
a plug in such manner as
ily pushed in: append the
uilibrio, to the hydrostatic
drive in the plug: the
flow and destroy the equili-

s every way alike, though
tendency is to gravitation.
sel be made weaker in the
ne bottom, and be so laden,
by the weight of water, as
essel, the weakest part wher-
will become the outlet; but,
erated, the fluid will invari-
l; unless acted upon by a
pressure upwards is merely
with circumstances atten-
neral pressure, and proves
of fluids to find their own

ress in all directions, their
cannot be applied against
ide; while on the other hand
ces, the bottoms of vessels
ssure which does not appear
e. Thus, in a pan whose base
than its brim, the bottom sus-
e weight of a column equal
ultiplied by its height; yet
e of a bell-shape, having its
r than its brim, the bottom
a weight equal to its area
ied by its height. Conse-
vessel of a conical form the
be oppressed as much as if
re cylindrical. This is called
tic paradox; but will be easi-
d by the consideration, that if
ss be made with a curved
s to turn up in the form of
J, but with one leg or part
r than the other, the water
qually in both. If to each a
tted, their weight being equal,
e piston be first put into the
the tube, it will cause the fluid
he other in proportion to its
on applying the lesser *piston to*

the corresponding smaller tube, the two will be held in equilibrio. We have indeed further proof of the pressure of water upwards, by means of two boards, whose sides are joined by leather, as in a pair of bellows: At the top of one of the boards cut a hole, and insert a tube of about four or five feet in length, so as to be perfectly tight: place on the board several weights according to the size of the machine, and pour water into the tube. The upper board will bear up against the weights, provided they be not disproportionately heavy, and will admit the water between the top and bottom to the extent admitted by the pliable sides. A circle of about twenty inches in diameter will thus lift and support three weights, of 100 *lb*. each.

If a vessel contain two immiscible fluids (such as water and mercury) and a solid of some intermediate gravity be immersed under the surface of the lighter fluid, and float on the heavier, the part of the solid immersed in, the latter will be to the whole solid as the difference between the specific gravities of the solid and of the lighter fluid is to the difference between the specific gravities of the two fluids.

Balloons are properly hydrostatic machines, deriving their property of ascending from the earth into the upper part of our atmosphere entirely to the difference between the specific gravity of the air, or gas, with which they are filled, and the exterior or atmospheric air in which they float. The *diving bell* also depends on hydrostatic principles, though, like the balloon, it has a close connection with *pneumatics*.

Bodies whose bases are angular, like the keels of ships, will be immersed deeper than those whose bases are flat, such as barges; hence sharp-built vessels necessarily (to use the technical term) "draw more water" than those of a more obtuse form: For, as every body floating on a fluid will be immersed in proportion to its weight, and will displace a quantity of water equal thereto, it follows, that as a triangle is equal to only half a parallelogram of equal base and altitude, a parallelogram (or flat-bottomed vessel) will, under equal pressure, sink only half the depth of a triangular shaped bottom of equal base and altitude.

It must be obvious, that whether the vessel alone, or the circumstance of her being laden, cause her to weigh more than the quantity of water displaced by her whole bulk, up to the very gunwale, is not material; for in such case she cannot float, but must be depressed by the sum of specific gravity thus produced. This will appear in a very natural and simple manner, if we load a cup with small shot, &c.; for, though partly empty, the cup will sink whenever the whole weight may exceed that of the water displaced. Both the cup and the shot are, however, specifically heavier than their bulk of water, and the former would sink if let in sideways; but then it would only displace a quantity of water corresponding with its own bulk, which would be trivial when compared with that removed by its pressure as a floating body.

See Hydraulics and *Pneumatics*.

for whatever body either swells or shrinks by dryness or moisture, is capable of being formed into an hygrometer. Such are woods of most kinds, particularly ash, deal, poplar, &c. Such also is catgut, the beard of a wild oat, hempen cords, &c. Philosophers have sought also to measure the humidity of the air by the augmentation of weight undergone by certain substances, such as a tuft of wool, or portions of salt, by absorbing the water contained in the air. But, besides that these methods were in themselves very imperfect, the bodies employed were subject to alterations which would make them lose their hygrometric quality more or less promptly. The hygrometer invented by Saussure is free from these inconveniences. The principal piece in it is a hair, which has been divested of a kind of oiliness that is natural to it by boiling it in water holding in solution nearly a hundredth part of its weight of sulphate of soda. It is known that humidity lengthens the hair, and that the process of drying shortens it. To render both these effects more perceptible, he attached one of the two ends of the hair to a fixed point, and the other to the circumference of a movable cylinder, that carries at one of its extremities a light index or hand. The hair is bound by a counter weight of about three grains, suspended by a delicate silk which is rolled in a contrary way about the same cylinder. In proportion as the hair lengthens or shortens, it causes the cylinder to turn in one or the other direction, and by a necessary consequence, the little index turns likewise, the motions of which are measured on the circumference of a graduated circle, about which the index performs its revolution as in common clocks. To give to the scale such a basis as may establish a relation between all the hygrometers constructed upon the same principles, Saussure assumes two fixed terms, the extreme of humidity, and that of dryness:

of extreme h
slip of whale-
and to fix the
of extreme dr
cined lime, w
hygrometer u
A simple h
by means of
and having a
index moving
of the index, f
should be ten
from the fulcr
to which the c
The air becom
its moisture;
shortened, an
contrary, the
discharges its
the index fall
HYMEN,
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semilunar fig
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HYMENÆ
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natural order
nosæ, Jussieu.
five parted ;
style twisted
farinaceous p
cies, viz. H.
grows to a co
Indies, and is
timber.
HYMENOP
the fifth order
Linnæan syste
four membran
sting, or a pro
HYOBANCH
didynamia ang
Natural order
lares, Jussieu.
rolla ringent, w
two-celled, ma
one species, vi
of the Cape of

rhetoric, a figure,
ind reality of things
ged, or diminished.
indroid, is a solid fi-
ion is thus given by
en. Two opposite
ied by the transverse
centre a right line
angles to that axis;
axis, the hyperbolas
volve; by such re-
be generated, which
ic cylindroid, whose
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curve is that which
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call the hyperbola

botany, *St. John's*
olyadelphia polyan-
. Natural order of
ssieu. Calyx five-
filaments many, con-
ive bundles. There
, most of them hardy

tany, a genus of the
. class and order.
ifed, three parted;
mens six, inserted
ale, calyx and coroi-
ular, with three stig-
lled, three valved;
is but one species,
. little plant growing
ler water in Guia-

any, a genus of the

corolla, six-parted, permanent, superior; capsule narrow at the base. There are fourteen species.

HYRAX, in natural history, a genus of mammalia of the order glires. Generic character: front teeth in the upper jaw two broad and somewhat distant; in the lower jaw four, broad, flat contiguous and notched: grinders large, four on each side in both jaws; fore-feet, four-toed, hind-feet three-toed; no tail; no clavicles. H. capensis, is about as large as a rabbit, and abounds in the mountainous districts near the Cape of Good Hope. H. syriacus or the bristly hyrax, is to be met with in Ethiopia and Abyssinia. Its full length is about seventeen inches. These animals are called by the natives of these countries Ashkokos. They are gregarious, and, occasionally, seen in companies of several scores, basking before the clefts of the rocks in the open sunshine. They are gentle, weak and fearful, but if handled will bite with great severity. They are supposed to live on grain, fruits, and roots.

HYPTIS, in botany, a genus of the didynamia gymnospermia class and order. Natural order of verticillatæ. Labiatæ, Jussieu. Calyx turbinate; corolla with a very spreading border, lower lips semibifid; anthers hanging down. There are two species.

HYSSOPUS, in botany, *hyssop*, a genus of the didynamia gymnospermia class and order. Natural order of verticillatæ, Jussieu. Corolla, lower lip with a small crenate segment; stamens straight, distant. There are three species.

HYSTERICS. See *Medicine*.

HYSTRIX, *porcupine*, in natural history, a genus of quadrupeds of the order glires.

I or i, the ninth letter and third vowel of the alphabet. Used as a numeral, it signifies no more than one, and stands for so many units as it is repeated times: thus I, one; II, two: III, three, &c. and when put before a higher numeral it substracts itself, as IV, four; IX, nine, &c.: but when set after it, so many are added to the higher numeral as there are I's added: thus VI, is 5+1 or six; VII. 5+2 or seven; VIII, 5+3, or eight. The ancient Romans likewise used IↃ for 500, CIↃ for 1,000, IↃↃ for 5,000, CCIↃↃ for 10,000, IↃↃↃ for 50,000 and CCCIↃↃↃ for 100,000. Farther than this, as Pliny observes, they did not go in their notation; but when necessary, repeated the last number, as CCCIↃↃↃ, CCCIↃↃↃ for 200,000; CCCIↃↃↃ, CCCIↃↃↃ, CCCIↃↃↃ for 300,000, and so on.

JACK, in mechanics, an instrument of common use for raising heavy timber or very great weights of any kind. The common *kitchen jack* is a compound engine, where the weight is the power applied to overcome the friction of the parts, and the weight with which the spit is charged; and a steady and uniform motion is obtained by means of the fly.

JACK, in naval affairs, a sort of flag, or colours, displayed from a staff erected on the outer end of a ship's bowsprit.

JACK *Smoke*. See *Smoke jack*.

JACK *in the box*, a large wooden male screw turning in a female one, which forms the upper part of a strong wooden box, shaped like a frustrum of a pyramid. It is used by means of levers passing through holes in it, as a press in packing and for other purposes.

JACK *block*, a block occasionally attached to the top-gallant tie, and through which the top-gallant top-rope is reeved to sway up or strike the yard.

JACKALL, See *Canis*.

JACKET, *Cork*. See *Cork jacket*.

JACOB'S *staff*. See *Cross*.

JACOBUS, an ancient gold coin worth

JADE *Stone*. See
JALAP, a plant
gynia class. See
Medica.
IAMBICS, cert
which are suppose
to the ancient com
plied also to a pa
verse, of which th
of a short and long
JANSENISTS, a
tholics in France,
ons of Janseniue, b
like those of Calv
and predestination
JAPANNING, i
and painting ornam
&c. in the same m
the natives of Ja
which admit of bein
every kind that are
too flexible; as woo
paper, prepared for
instances the inequa
ces to be japanned
priming composed
whiting: but from th
coats are liable to cr
When a priming i
should be prepare
with fish-skin or gl
made thoroughly cle
over once or twice
with two thirds wa
mon strength. The
be laid on as even a
be formed of a size,
tween the common
with as much whit
sufficient body of c
face. This being re
lities are compleatl
must be cleaned
and polished with
wood or leather or
panned, and no
best preparation is
coats of coarse varn

ndarach, or gum mastich. When
is thus used, it should be well dilu-
h oil of turpentine. In some in-
s, water-colours are laid on grounds
; and are best, when so used in
proper appearance, without any
h over them; and they are also
mes so managed as to have the
of embossed work. The colours
yed in this way, for painting, are
repared by means of isinglass size,
ted by honey or sugar-candy.

finishing of japan-work depends
laying on, and polishing the outer
f varnish. This is in general done
with common seed-lac varnish.
brightness, however, is the most
ial point, and a tinge of yellow will
it, seed-lac must give way to the
gums; but where hardness and a
r tenacity are most essential, it
be adhered to; and where both
ecessary, a mixed varnish must be
ed.

common seed lac varnish may be
made:—Take of seed-lac three
es, and put it into water, to free it
the sticks and impurities. Dry it
and powder it grossly, and put it,
a pint of rectified spirit of wine, into
tle, of which it will not fill above
irds. Shake the mixture well to-
r, and place the bottle in a gentle
ill the seed-lac appears to be dis-
d, the shaking being in the mean
repeated as often as may be conve-
s and then pour off all that can be
ed clear by this method, and strain
mainder through a coarse cloth.
rnish thus prepared, must be kept
in a bottle well stopped.

re a pure white or a great clear-
other colours is in question, the
ace used in polishing should be
but the browner sorts of polish-
t may be used in other cases. The
of work to be varnished, should
le warm and perfectly dry; and
he varnish may be rubbed over
by beginning in the middle, and
the brush to one end; and then
other stroke from the middle, pas-
to the other. But no part should
sed, or twice passed over, in form-
coat. When one coat is dry, ano-
ust be laid over it till there be a
nt thickness of varnish to bear the
without laying bare the painting
nd-colour. The polish is done, in
on cases, by rubbing it with a rag
in tripoli, or rotten-stone, finely
red; but, towards the end of the
g, a little oil of any kind should be
long with the powder; and when
rk appears sufficiently glossy, it
be well rubbed with the oil alone,
an it from the powder, and give it a
ighter lustre.

GON. See *Zircon.*

IONE, in botany, a genus of the
esia monogamia class and order.
al order of campanaceæ. Essential
cter: calyx, common, ten-leaved:
la five-petalled, regular; capsule
or, two-celled. There are four
s, natives of the West Indies.

MINUM, in botany, *jasmine tree*, a
of the diandria monogynia class and
order. Natural order of sepiariæ. Corolla salver-shaped; berry dicoccous; seeds arillated; antheræ within the tube. There are 17 species.

JASPER, in mineralogy, a species of the clay genus, divided into six sub-species.

The *Egyptian jasper* exhibits two or more colours in concentric zones or bands, more or less regular, with interspersed spots or dendritic figures. It is brittle, and the specific gravity is about 2.6. It occurs in rolled pieces, which are mostly spherical. Before the blow-pipe it is infusible without addition, and on account of its beautiful colour and great hardness it is used for similar purposes as the agate. The colours of the *striped jasper* are grey, green, yellow, and red; these are often found together, and arranged in striped and flamed delineations. It occurs in large beds in Saxony, and also in Siberia, where it is of a very beautiful kind. It admits of a high polish, and is used for purposes of ornament chiefly. The *porcelain jasper* generally exhibits but a single colour. Melted before the blow-pipe it is found to consist of Silica, 60.75; alumina, 27.25; magnesia, 3.00; oxide of iron, 2.50; potash, 3.66; loss, 2.84. The *common jasper* is found in veins in primitive rocks. It is susceptible of a high polish. *Opal jasper* is found in nests, in porphyry, near Tokay, in Hungary, in the neighbourhood of Constantinople, and in some Siberian mountains. It is supposed to be the connecting link between jasper and opal, and is distinguishable by the liveliness of its colours, its superior lustre, and constant conchoidal fracture.

JATROPHA, in botany, a genus of the monoecia monadelphia class and order. Natural order of tricoccæ. Euphorbiæ, Jussieu. Male, calyx none; corolla one-petalled, funnel-form; stamina ten, alternately longer and shorter: female, calyx none; corolla five-petalled, spreading; styles three, bifid; capsule three-celled; seed one. There are nine species, of which the most remarkable are, 1. The curcas, or English physic nut. 2. The gossypifolia, cotton-leaved jatropha. 3. The multifida, or French physic nut. 4. The manihot, or bitter cassada, has palmated leaves; the lobes lanceolate, very entire, and polished. 5. The janipha, or sweet cassada, has palmated leaves, with lobes very entire; the intermediate leaves lobed with a sinus on both sides. 6. The elastica, or hevea guianensis, with ternate leaves elliptic, very entire, hoary underneath, and longly petiolated. See *Caoutchouc.*

The root of bitter cassada has no fibrous or woody filaments in the heart, and neither boils nor roasts soft. The sweet cassada has all the opposite qualities. The bitter, however, may be deprived of its noxious qualities (which reside in the juice) by heat. Cassada bread, therefore, is made of both, thus: the roots are washed and scraped clean, then grated into a tub; after this, they are put into a hair bag, and strongly pressed, to squeeze out the juice, and the meal is dried in a hot stone bason over the fire. Cassada roots yield a great quantity of starch, which the

ing into crystals crossing each other in
gles of sixty degrees. During this pro
the temperature remains constant,
ing 32 deg. of Fahrenheit. See *Water*, C
and *Freezing*.

ICE *house*, a building contrived to p
serve ice in summer. It ought to be p
ced upon a dry and elevated spot.
circular form is most proper for the w
At the bottom of it a space about two f
deep should be left to receive any mo
ure that may drain from the ice; o
this space should be placed a stro
wooden grate, with a layer of straw
reeds on it, and from thence a small dra
should be laid under ground. The sid
should be built with brick, at least tw
bricks thick. When it is brought up wit
in three feet of the surface, another out
arch should be begun, which should b
carried up to the height of the top of the i
tended arch of the well; the roof must b
high enough above the inner arch to adm
of a doorway to get out the ice. If th
building is to be covered with slates c
tiles, reeds should be laid considerabl
thick under them, to keep out the su
and external air. In putting in the ice
care must be taken to ram it as close a
possible; and to allow a vacancy of abou
two inches, all round, next the side of the
well, to give passage to moisture occasi
oned by the melting of the ice.

ICH DIEN, the motto of the Prince o
Wales's arms, signifying "I serve."

ICHNEUMON, a genus of insects of
the hymenoptera order; mouth with a
straight horny membranaceous bifid jaw,
the tip rounded and ciliate; mandibles
curved sharp; lip cylindrical, membranaceous at the tip and emarginate; feelers
four, unequal filiform, seated in the middle of the lip; antennæ setaceous, of more
than thirty articulations; sting exerted,
inclosed in a cylindrical sheath, composed of two valves, and not very pungent.
There are more than five hundred species.

nt or order of recurrence. We
e perform a positive act, in many
, in bringing them forward,
e call an act of the memory, or
ion; and their concomitant ap-
, or the succession of ideas by
on in the similarity or the order
ensations, has been called the
on of ideas. The same term is
applied, when we speak of the
ce, in idea, of an entire contem-
is sensation, in consequence of
being brought forward in the
.

ITY, denotes that by which a
self, and not any thing else.

I, among grammarians, properly
the peculiar genius of each lan-
it is often used in a synonimous
th dialect.

YNCRASY, among physicians,
peculiar temperament of body,
it is rendered more liable to cer-
ders, than persons of a different
on usually are.

S, in law. An idiot is a fool or
from his nativity. According to
e 17 Edward II. c. 9, the king
e the custody of the lands of na-
is, taking the profits of them
waste or destruction, and shall
n necessaries. And, after the
hem he shall render it to the
.

seldom happens, that a jury
man an idiot from his nativity,
non compos mentis, from some
r time; in which case, he
der the denomination of a lu-
whose lands the king shall not
profit, but is accountable for the
he lunatic when he comes to his
d, or to his executors or admi-
.

t, or person *non compos*, may in-
f purchase, and if he marry
his wife shall be endowed.
a general rule, that idiots and lu-
ng incapable of judging between
evil, are punishable by no cri-
secution whatsoever. Acts so-
knowledged by them in a court
as fines and recoveries, and the
ered on them, are good, and
avoided by themselves or re-
ves. But during their lunacy
ncapable of making any will or
, as are also persons grown
om extreme old age. When an
or defends, he must appear:
tic shall appear by guardian
ney.

Jeer-rope, in a ship, is a large
ed through double or treble
hed at the mast head, and on
n order to hoist or lower the
.

AH, one of the Scripture names
nifying the Being who is self-ex-
gives existence to others.

M, in anatomy, the second of
ntestines.

n chemistry. If we press out
f ripe currants, and many other
and let it remain in a state of
tly coagulates into a tremu-
bstance. If we wash the co-
ith a small quantity of water, we obtain jelly approaching to a state of purity, and nearly colourless, unless tinged by the peculiar colouring matter of the fruit; it has a pleasant taste, and a tremulous consistency. It is scarcely soluble in cold, but very soluble in hot water; and when the solution cools, it again coagulates. When long boiled, it loses the property of gelatinising by cooling.

JELLY, *animal*. See *Gelatine*.

JESUITS, in church history, or the society of Jesus, a celebrated religious order in the Romish church, founded by Ignatius Loyola, a Spaniard. To the three ordinary monastic vows of chastity, poverty, and obedience, they added a fourth, which was, to go wherever the pope should command. The order was abolished in 1773.

JESUIT'S BARK. See *Cinchona*.

JET, a black, inflammable bituminous substance harder than asphaltum, and susceptible of a good polish; it becomes electrical by rubbing, attracting light bodies like yellow amber. See *Coal*.

JET *d'eau*, a fountain that casts up water to a considerable height in the air. See *Hydraulics*.

JETSAM, any thing thrown out of a ship being in danger of wreck, and by the waves driven to the shore.

JETTY *head*, that part of a wharf which projects beyond the rest.

JEWEL *blocks*, two small blocks suspended at the extremity of the main and fore-top sail yards, to retain the upper part of the top-mast studding-sails beyond the sheets of the top sails.

JEWS, in church history, the descendants of Judah, the son of Jacob, and of the Israelites, commonly denominated the Twelve Tribes of Israel. This name was first given to those Jews who returned from the captivity of Babylon, because the tribe of Judah made the most conspicuous figure among them.

The following is a summary of their religious creed: 1. That God is the creator and active supporter of all things. 2. That God is one, and eternally unchangeable. 3. That God is incorporeal, and cannot have any material properties. 4. That God shall eternally subsist. 5. That God is alone to be worshipped. 6. That whatever has been taught by the prophets is true. 7. That Moses is the head and father of all contemporary doctors, and of all those who lived before, or shall live after him. 8. That the law was given by Moses. 9. That the law shall always exist, and never be altered. 10. That God knows all the thoughts and actions of men. 11. That God will reward the observance and punish the breach of his law. 12. The Messiah is to come, though he tarry a long time. 13. That there shall be a resurrection of the dead when God shall think fit. In England in former times, the Jews and all their goods belonged to the chief lord where they lived; By stat. Edward I. the Jews, to the number of 15,000, where banished out of England; and never returned till Oliver Cromwell re-admitted them. Whenever any Jew shall present himself to take the oath of abjuration in pursuance of *the 10 George* III. c. 10, the words—upon the true faith of a Christian—shall be omitted. If Jewish parents refuse to allow their Protestant children a maintenance suitable to their fortune, the lord chancellor, upon complaint, may make such order therein as he may think proper.

JEWS' *harp*, in music, an instrument well known among the lower classes in this country, almost the only musical instrument made use of by the inhabitants of the island of St. Kilda.

IGNATIA, in botany, a genus of the pentandria monogynia class and order. Natural order of Luridæ. Apocineæ, Jussieu. Calyx five-toothed, corolla funnel-form, very long; fruit one-celled, many-seeded. There are two species.

IGNIS-FATUUS, or Will-with-a Wisp. See *Meteors* and *Hydrogen*.

IGNITION, in chemistry, is that illumination, or emission of light, produced in bodies by exposing them to a high temperature, and which is not accompanied by any other chemical change in them. The point of temperature, at which the first stage of ignition takes place, or at which bodies arrive at a red heat, is supposed to be about 800 deg. of Fahrenheit. By raising the temperature, the illumination becomes brighter, and the red light acquires a mixture of yellow rays. At length, by still increasing it, we come to the white heat, which is the highest state of ignition.

JIB, in naval affairs, the foremost sail of a ship, being a large stay sail extended from the outer end of the bowspit, prolonged by the jib-boom, towards the fore-top-mast-head.

JIB *boom*, is a continuation of the bow-sprit foreward, and serving to extend the bottom of the jibs and the stay of the fore-top-gallant-mast.

JIGGER, in naval affairs, a machine consisting of a piece of rope five feet long, with a block at one end, and a sheave at the other, used to hold on the cable when it is heaved into the ship by the revolution of the windlass.

ILEX, in botany, *holly*, a genus of the tetrandria tetragynia class and order. Natural order of Dumosæ. Rhamni, Jussieu. Calyx four-toothed; corolla wheel-shaped; style none; berry four-seeded. There are sixteen species. This genus consists of small trees or shrubs, with alternate leaves, evergreen, toothed, or thorny; and axillary, many-flowered peduncles. I. aquifolium, common holly, is usually from twenty to thirty feet in height, though it sometimes exceeds sixty feet. The holly makes an impenetrable fence, and bears cropping well, nor does its verdure suffer from the severest of our winters. The wood is the whitest of all hard woods. Sheep and deer are fed during the winter with the croppings. Birds eat the berries. The bark fermented and afterwards washed from the woody fibres, makes the common bird-lime.

ILIAC *passion*. See *Medicine*.

ILIUM, in anatomy, the third and last of the small intestines.

ILLECEBRUM, in botany, a genus of the pentandria monogynia class and order. Natural order of holoraceæ. Amaranthi, Jussieu. Calyx five-leaved, cartilaginous; corolla none; stigma simple; capsule five-valved, one-seeded. There are twenty-one species.

ILLICIUM, in botany, a genus of the polyandria polygynia class and order. Natural order of coadunatæ. Magnoliæ, Jussieu. Essential character: Calyx five-leaved; petals, twenty-seven; capsules several disposed in a circle; bivalve, one-seeded. There are two species, viz. I. anisatum of China and Japan, yellow-flowered aniseed tree; and I. floridanum, red-flowered aniseed tree.

ILLUMINATING, a kind of miniature painting, anciently much practised for illustrating and adorning books. Besides the writers of books, there were artists whose profession was to ornament and paint manuscripts, who were called illuminators. Some of the ancient manuscripts are gilt and burnished in a manner superior to later times. Their colours were excellent, and their skill in preparing them must have been very great.

IMAGE, in optics, is the appearance of an object made either by reflection or refraction. In all plane mirrors, the image is of the same magnitude as the object, and it appears as far behind the mirror as the object is before it. In convex mirrors, the image appears less than the object; and farther distant from the centre of the convexity, than from the point of reflection. By the following rule, the diameter of an image projected in the base of a convex mirror, may be found. "As the distance of the object from the mirror is to the distance from the centre of the glass, so is the diameter of the object to the diameter of the image."

IMAGINATION, a power or faculty of the mind, whereby it conceives and forms ideas of things communicated to it by the outward organs of sense.

IMAM, the head of the congregation in Mahometan mosques.

IMBEZZLE, signifies to steal or purloin goods, &c. entrusted to a person's charge. Servants embezzling their master's goods to the value of 40s. are guilty of felony without benefit of clergy.

IMCBICATED, an appellation given to such leaves of plants as are placed over one another like the tiles of a house.

IMITATIVE, in music, a term applicable to that music, which is composed in imitation of the effects of some of the operations of nature, art, or human passion.

IMMATERIAL, something devoid of matter, or that is pure spirit.

IMMEMORIAL, in law, an epithet given to the time or duration of any thing, whose beginning we know nothing of. In a legal sense, a thing is said to be of time immemorial, that was before the reign of King Edward the II.

IMMENSITY, an unlimited extension, or which no finite and determinate space, repeated ever so often, can equal.

IMMERSION, in astronomy, is when a star or planet is so near the sun with regard to our observation, that we cannot see it; being, as it were, hidden in the rays of that luminary. It also denotes the beginning of an eclipse of the moon, and is applied to the satellites of Ju-

they appear to enter within
that planet.
ABILITY, one of the divine
The immutability of God is
hysical and moral. The first
this, that the divine essence
nor possibly can, receive any
; and the moral immutability
on the perfection of his nature,
e always wills the same things,
are best on the whole.
ED, in heraldry, when the coats
nd his wife who is not an heiress
in the same escutcheon, they
marshalled in pale; the hus-
the right side, and the wife's

LANCE, is a petition in court,
o consider or advise what an-
lefendant shall make to the ac-
plaintiff.
BLE, that which is exempt
ering, or cannot undergo si-

ENS, in botany, a genus of
nesia monogynia class and or-
ural order of corydales. Gera-
eu. Calyx two-leaved: corolla
led, irregular, with a cowled
capsule superior, five-valved.
twelve species.
CHMENT, is the accusation and
n of a person in parliament,
, or other crime and misdemea-
e articles of impeachment are a
lls of indictment, found by the
ommons, and afterwards tried
ds. By stat. 12 and 13 W. M. c. 2.
under the great seal, shall be
to an impeachment by the com-
arliament.
CHMENT of *waste*, signifies a
from committing of waste upon
tenements.
MENTS, in law, persons under
ents are those within age, under
, *non compos mentis*, in prison,
d seas; who by saving in our
e time to claim and prosecute
after the impediments removed,
fines levied, &c.
ETRABILITY, in philosophy.
erty of body, whereby it cannot
ed by another: thus, a body,
fills a space as to exclude all
said to be impenetrable. Or
y which a body has of excluding
her body from the place that it
, in such manner that two bodies
contact can never occupy less
n that which they filled when
e separate.
ATIVE, one of the moods of a
sed when we would command,
or advise.
ATORIA, in botany, a genus of
tandria digynia class and order.
order of umbellatæ, or umbelli-
ruit roundish, compressed, gib-
he middle, surrounded by a mar-
tals inflex, emarginate. There
ne species, viz. 1. ostruthium
woit. The root is esteemed a
orific.
RFECT, something that is defec-
that wants some of the proper-
d in other beings of the same
hus mosses are called *imperfect* plants, because almost all the parts of fructification are wanting in them.

IMPERFECT *numbers*, such whose aliquot parts taken together do either exceed, or fall short of that whole number of which they are parts: they are either abundant or deficient.

IMPERSONAL *verb*, in grammar, a verb to which the nominative of any certain person cannot be prefixed.

IMPETIGENES, in medicine, descriptive of those disorders which, from a general bad habit, manifest themselves principally by disfiguring the skin and external parts of the body.

IMPETUS, in mechanics, the force with which one body impels or strikes another.

IMPLEAD, to sue or prosecute by course of law.

IMPLICATION, in law, is where the law implies something that is not declared between parties in their deeds and agreements, and when our law gives any thing to a man, it gives by implication whatever is necessary for enjoying it.

IMPONDERABLE *substances*. See *Substances, imponderable*.

IMPORTATION, the act of bringing goods into a country from foreign parts. It has generally been considered, that for any country to carry on a profitable trade, it is necessary that the value of the goods sent out of it should be greater than that of the articles imported: this, however, is a very erroneous axiom, unless it is understood with great limitations. All articles of merchandize, imported merely for re-exportation, and also such as are used or worked up in our own manufactures, are far from being hurtful to our commerce, and may even, in many respects, be deemed of equal profit with our own native commodities. It is therefore an excess of such importations alone, as are either for mere luxury, or mere necessity, or for both together, which is disadvantageous to the country.

IMPOSTHUME, a collection of matter or pus in any part of the body. See *Surgery*.

IMPOSSIBLE *roots*, in algebra. To discover how many impossible roots are contained in any proposed equation, Sir I. Newton gave this rule, *viz.* Constitute a series of fractions, whose denominators are the series of natural numbers, 1, 2, 3, 4, 5, &c. continued to the number, showing the index or exponent of the highest term of the equations, and their numerators the same series of numbers in the contrary order, and divide each of these fractions by that next before it, and place the resulting quotients over the intermediate terms of the equation, then under each of the intermediate terms, if its square multiplied by the fraction over it, be greater than the product of the terms on each side of it, place the sign +; but if not, the sign —; and under the first and last term place the sign +. Then will the equation have as many imaginary roots as there are changes of the underwritten signs from + to —, and from — to +. So for the equation $x^3 - 4x^2 + 4x - 6 = 0$, the series of fractions is $\frac{3}{1}, \frac{2}{2}, \frac{1}{3}$: then the second, divided by the first, gives $\frac{2}{6}$ or $\frac{1}{3}$, and the third divided by the second gives $\frac{1}{3}$ also; hence these quotients placed over the intermediate terms, the whole will stand thus:

$$\begin{array}{cccc} & \frac{1}{3} & \frac{1}{3} & \\ x^3 & -\,4x^2 & +\,4x & -\,6. \\ + & + & - & + \end{array}$$

Now because the square of the second term, multiplied by its superscribed fraction is, $\frac{16}{3}x^4$, which is greater than $4x^4$, the product of the two adjacent terms, therefore the sign of + is set below the second term; and because the square of the third term, multiplied by its overwritten fraction, is $\frac{16}{3}x^2$, which is less than $24x^2$, the product of the terms on each side of it; therefore the sign − is placed under that term; also the sign + is set under the first and last terms. Hence the two changes of the underwritten signs + + − +, the one from + to −, and the other from − to +, show that the given equation has two impossible roots. When two or more terms are wanting together, under the place of the deficient terms write the sign −, under the second the sign +, under the third −, and so on, always varying the signs, except that under the last of the deficient terms must always be set the sign +, when the adjacent terms on both sides of the deficient terms have contrary signs. As in the equation,

$$\begin{array}{cccccc} x^5 & +\,ax^4 & * & * & * & +\,a^5 = 0. \\ + & + & - & + & - & + \end{array}$$

which has four imaginary roots.

IMPOSTS, in architecture, the capitals of pillars, or pilasters, which support arches. An impost sometimes called chaptrel, is a sort of a plinth, or little corniche, which crowns a pier, and supports the first stone whence an arch or vault commences. See *Architecture*.

IMPOTENCY, in the ecclesiastical law, an inability of generation, which is a cause of divorce.

IMPRESSING *men*. The power of impressing seamen for the sea-service, by the King's commission, has been a matter of some dispute, and submitted to with great reluctance, though it has very clearly and learnedly been shown by Sir Michael Forster, that the practice of impressing seamen for the sea-service, and granting power to the Admiralty for that purpose, is of a very ancient date, and has been continued by a series of precedents, to the present time, whence it has been held to be a part of the common law; and though no statute has expressly declared this power to be in the crown, many of them very strongly imply it. Landmen, entering into the merchant service, and apprentices, are exempt for two years from the impress, and all apprentices to the sea-service under eighteen.

IMPRESSION, the edition of a book, regarding the mechanical part only.

IMPRISONMENT, is the restraint of a man's liberty under the custody of another, and extends not only to a gaol, but an house, stocks, or where a man is held in the street, or any other place. None shall be imprisoned but by the lawful judgment of his peers, or by the law of the land.

IMPROPRIATION, is when a benefice ecclesiastical is in the hands of a layman, and appropriation when in the hands of a bishop, college, or religious house. It is said there are 3845 impropriations in England.

IMPULSE, in mechanics, the single and instantaneous action or force by which a body is impelled.

INARCHING. See *Grafting*.

IN AUTER DROIT, in another's right, as where executors or administrators sue for a debt or duty, &c. of the testator or intestate.

INCEST, is the carnal knowledge of persons within the Levitical degrees of kindred.

INCH, a measure of length, being the 12th part of a *foot*, and equal to three barley-corns in length.

INCH *of Candle*, sale by. See *Candle*.

INCHASING. See *Enchasing*.

INCIDENCE, in mechanics, the direction in which one body strikes on another. See *Mechanics* and *Optics*.

INCIDENT, signifies a thing necessarily depending upon another as more principal.

INCINERATION, in chemistry, the burning of vegetables for the sake of their ashes.

INCLINATION, is used by mathematicians to signify the mutual approach, tendency, or leaning of two lines, or two planes towards each other, so as to make an angle.

INCLINED *plane*, in mechanics, one that makes an oblique angle with the horizon. See *Mechanics*.

INCLOSURES. Any person who shall wilfully or maliciously destroy or damage any fence made for inclosing any common waste, or other lands, in pursuance of any act of parliament, shall be transported for seven years.

INCOME *tax*, a direct contribution of a certain proportion of the annual profits of individuals for the public service.

INCOMMENSURABLE, a term in geometry, used where two lines, when compared to each other, have no common measure, how small soever, that will exactly measure them both. And in general two quantities are said to be incommensurable, when no third quantity can be found that is an aliquot part of both.

INCOMMENSURABLE *numbers*, such as have no common divisor.

INCOMPLETE, in botany, a term used to denote the sixteenth class of the Linnæan "methodus calycina," consisting of plants whose flowers want either the calyx or petals.

INCORPORATION, *power of*. To the erection of any corporation the king's consent is necessary, either impliedly or expressly given. The methods by which

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or charter.
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Isaac Newton
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writing to se-
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algebra, shows
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olute number,
doth consist;
hether an inte-

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he globe, and
s out the hours

houc.
nar, the first
ating a verb,
, deny or ask

INDICTION, a cycle of fifteen years. See *Chronology*.

INDICTMENT, is a written accusation of one or more persons, of a crime or misdemeanor, preferred to, and presented on oath by, a grand jury. An indictment may be found on the oath of one witness, unless it be for high treason, which requires two witnesses, and unless in any instance it is otherwise specially directed by acts of parliament. The sheriff of every county returns to every session of the peace, and every commission of oyer and terminer, and of general gaol delivery, twenty-four good and lawful men of the county, some out of every hundred, to enquire, present, and do all those things, which on the part of the king, shall be commanded therein. As many as appear are sworn of the grand jury to the amount of twelve, at the least, and not more than twenty-three. Being previously instructed in the articles of their enquiry, by a charge from the judge, they receive indictments, preferred to them in the name of the king, but at the suit of any private prosecutor; and they only hear evidence on behalf of the prosecution. They may not find part of an indictment true, and part false, but must either find a true bill, or an ignoramus, for the whole. All capital crimes whatsoever, and all kinds of inferior crimes which are of a public nature, may be indicted, but no injuries of a private nature, unless they in some degree concern the king. And generally, where a statute prohibits a matter of public grievance, or commands a matter of public convenience, every disobedience to it is punishable, not only at the suit of the party grieved, but also by indictment. Yet if the party offending, have been fined in any action brought by the party, such fine is a good bar to the indictment. Several offenders committing the same offence may be joined in one indictment. No indictment for high treason, or misprision thereof, (except indictments for counterfeiting the king's coin seal, sign, or signet), shall be quashed for mis-reciting, mis-spelling, &c. unless exception concerning the same be taken, before any evidence given in open court, on such indictment. An indictment accusing a man in general terms, without ascertaining the particular fact laid to his charge, is insufficient; nor can it be good, without expressly showing some place where the offence was committed.

There are several words of art, which the law has appropriated for the description of an offence which no circumlocution will supply; as feloniously, in the indictment of any felony; burglariously, in an indictment of burglary, and the like. And an indictment on the black act for shooting at any person, must charge that the offence was done wilfully and maliciously.

No clerk of assize, clerk of the peace, or other person, is allowed to take any money of any person bound over to give evidence against a traitor or felon, for the discharge of his recognisance, nor more than two shillings for drawing any bill of indictment against any such felon, on pain of five pounds to the party grieved, with the prosecutor, to take the party into custody, and he may be held to bail by a justice of the peace, or a judge. This was not formerly the practice, upon indictments, but an action cannot be brought by the person acquitted, against the prosecutor of the indictment, without obtaining a copy of the record of his indictment and acquittal; which, in prosecutions for felony, it is not usual to grant, if there be the least probable cause to found such prosecution upon. But an action on the case, for a malicious prosecution, may be founded on such an indictment whereon no acquittal can be, as, if it be rejected by the grand jury, or be coram non judice, or be insufficiently drawn; for it is not the danger of the plaintiff, but the scandal, vexation, and expence, upon which this action is founded. However, any probable cause for preferring it, is sufficient to justify the defendant, provided it do not appear that the prosecution was malicious.

INDIGESTION. See *Medicine.*

INDIGO, a dye prepared from the leaves and small branches of the *Indigofera tinctoria.* There are two kinds, the true and the bastard. The produce of the first is sold at a higher price on account of its superiority, but that of the other is heavier. The first will grow in many soils; the second succeeds best in those most exposed to rain. Both are liable to great accidents. Sometimes the plant becomes dry, and is destroyed by an insect frequently found on it; at other times the leaves are devoured in the space of 24 hours by caterpillars. It ought to be gathered in with great precaution, for fear of shaking off the farina that lies on the leaves, and is very valuable. When gathered, it is thrown into the steeping-vat, which is a large tub filled with water. Here it undergoes a fermentation, which in 24 hours, at farthest, is completed. A cock is then turned to let the water

hastily in the sun,
ced in heaps, and
a fortnight. It is
made up into ball
on each other, and
and sun. In this
and exhale a pu
When the ferment
a sufficient time, t
fall to a coarse pow

Indigo is a soft p
without either tas
goes no change, th
the air. Water, u
does not dissolve
duce any change.
to indigo, it emits
and at last burns a
white flame, leavin
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gen nor the simpl
any effect upon ind
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ed alkaline solution
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a state of solution.
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cipitated indigo, an
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effect upon indigo
it readily dissolve
The solution is at fi
gradually yellow.
phuric acid is diges
duces no effect, ex
the impurities; but
ric acid dissolves it
indigo, mixed with
acid, evolves heat,
about twenty-four

A, in botany, a genus of
lecandria class and order.
of papilionaceæ, or legu-
spreading; keel of the
n awl-shaped spreading
de; legume linear. There
, the most remarkable of
tinctoria, a native of the
frica, Asia, and America.
shrubs, under-shrubs, or
es are in some few cases
re ternate, in most une-
; the leaflets in some
ned at the base; stipules
e petiole; peduncles axil-
o flowered, in spikes or
of the species yield a blue

L., in logic, a particular
ecies, or that which cannot
two or more beings equal

E, among metaphysicians,
to be indivisible absolute,
visible, that is a simple
sists of no parts into which
led.
ES, in geometry, the ele-
iples into which any body
be ultimately resolved;
s are supposed infinitely
line may be said to consist
ace of parallel lines, and a
l and similar surfaces; and
each of these elements is
isible, if in any figure a
through the elements per-
he number of points in that
e same as the number of
whence we may see that a
prism, or cylinder, is re-
lements or indivisibles, all
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in use in Turkey and the East; beganum harmala, Sirian rue; of this the seeds are chiefly used: maslac of the Turks, or bangue of the Persians, prepared from the dust of the male flower of hemp; bangue of the Indians, from the leaves of the hibiscus abelmoschus; seeds of various species of the datura, or thorny apple; benang, or betel, of the Indians; roots of black henbane; hyoscyamus physalodes; berries of the night-shade; leaves of millefoil; tobacco. Artificial inebriants are fermented liquors from farinaceous seeds, wines, and spirits drawn by distillation.

INERTIA *of matter*, in philosophy, a passive principle by which bodies persist in a state of motion or rest, receive motion in proportion to the force impressing them, and resist as much as they are resisted. See *Mechanics*.

INFAMY, in law, which extends to forgery, perjury, gross cheats, &c. disables a man to be a witness or a juror; but a pardon of crimes restores a person's credit to make him a good evidence.

INFANCY, the first stage of life; in a medical and political view, extending from birth to about the seventh year.

Treatment of Infants in Health.

The two primary objects of attention on the birth of an infant are warmth and cleanliness.

There is generally too much eagerness in putting the child to the breast; who is often worried to suck before he becomes actuated by the instinctive principle of nature, or before the mother finds her breasts sufficiently filled with milk to satisfy his desire. It is generally about the third day after child-bed, that both are fully prepared. It is the duty of every mother to suckle her child. When in consequence of suppression of milk, and extreme delicacy, or disease of constitution, hired nurses must be resorted to.

cient to exhaust the system in an hour or two. Nothing however, can be more pernicious than the too common practice of administering cordials, opiates, &c. as often as the child seems restless.

The situation of infants requires at first air of a moderately warm temperature; after which they may be gradually inured to a colder atmosphere, without any danger to their health. Too much warmth, however, is as prejudicial as the opposite extreme, and the more to be dreaded, as every time they are brought to the open air, they are exposed to the danger of catching cold. But it is not merely a cold air that is to be avoided, it is the air that is confined, and at the same time loaded with moisture. A confined damp air is the cause of many of the diseases by which children are afflicted.

The nursery should be the largest and best-aired room in the house. When children sleep in a cradle, they should not be wrapped up too closely. Neither when they are further grown, should more than one child sleep in the same bed. In short, the proper regulation is, to keep the child as much as possible in one pure equal temperature, avoiding every thing that is damp and unwholesome.

The first exercise that children usually receive, is that of being dandled in the arm, or moved gently up and down, which tends much to assist digestion. Rubbing them with the hand is also highly useful.

As children increase in growth, their exercise should be proportionably augmented, and the nurse should endeavour to give them as much motion with her arm as possible.

As soon as a child is able to be put on its feet, it should be allowed to make use of them. Every member acquires strength in proportion as it is exercised; and children, by being accustomed to support themselves will soon acquire strength for the purpose. Children also begin to use their feet by degrees; and by this gradual

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n which it depends, be to-
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l the use of rhubarb and ab-
be ventured on, and con-
n occasional emetic till the
be completely cleared of
which may keep in the dis-
ntinue after a sufficient per-
this plan, light cordials and
l be interposed. When the
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treatment will be much re-
appearance of the stools.
een distinguished into sour,
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en it occurs, requires the
ful purgative, such as sen-
hild be old enough to bear
ldom mixed with the stools
e end of the disease, and an
eak of it is of little conse-
ery stools, where combined
ss, or an appearance of
r, are best removed by a
, and a warm purge. Slimy
n appearance of hiccup,
ated with magnesia and
nts, warmed by the addition
ated nutmeg. White and
re best corrected by a drop
water of kali, mixed with
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urgative medicines are used
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led cardamum seeds, dill or
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an acid of its own. The
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of disease than a disease in itself. It is an attendant upon all the complaints we have just noticed. Yet, though a mere symptom, it is often found so troublesome as to require specific attention. And here, in conjunction with the tribe of cordial stimulants just enumerated, we would strenuously advise the application of warm, stimulating liniments to the belly, which should be rubbed over it with easy but long repeated friction. If it do not yield to this plan, injections of a decoction of camomile flowers with a little ginger, or a few cardamum seeds should conjoin, and be repeated daily.

When diarrhœas proceed from a moist unwholesome atmosphere; or from a sudden suppression of any cutaneous eruption, the only chance of removing the complaint is, in the first instance, by removing the child into a healthier atmosphere; and in the second, by exciting the skin to a new efflorescence.

Another disorder, originating from a deranged state of the first passages, is *thrush*. It generally takes place in the first month, but may be entirely avoided under proper treatment. This complaint first appears in the corners of the lips, spreading over the tongue and cheeks, in the form of little white specks. Increasing in number and size, they run more or less together, according to their malignancy, and compose a thin white crust, which at last extends over the whole inside of the mouth, from the lips to the gullet, and even the stomach itself, and reaches at times through the whole length of the intestines, producing a redness at the fundament. When this crust falls off, it is succeeded by others, often of a darker colour; and the same appearance successively recurs till the disease departs.

It is sometimes preceded by sleepiness for a week or two. It is commonly with-preference; and it may be mixed up with sugar, in the proportion of one part of the former to seven of the latter. A small portion of this may be put on the child's tongue, which will dissolve and be conveyed to the other parts of the mouth; or it may be made up into a paste with honey.

The skin and cuticle of infants is peculiarly delicate and irritable, and the action of the air alone upon them, whenever there is a change in the temperature of the atmosphere, is almost always, and sometimes altogether sufficient to produce efflorescences of some kind or other.

The first eruption that is generally noticeable is the *red-gum*. It consists in a papulous efflorescence of small spots, confined to the face and neck; or in some cases extending to the hands and legs, and even the whole body in the form of large patches. It sometimes appears in small pustules, filled with a limpid, purulent, or yellow liquor; and frequently turns dry and horny, and scales off, without giving any further trouble. Another appearance it assumes, is like small pin heads, of a pearl colour, and not transparent. It is the effect of intestinal acrimony, connected with the delicate state of the skin, and determination of the blood towards it. Hence all that is wanted is an attention to the state of the bowels, and the use of testaceous powders in conjunction with cordials or antimonials; while the child should be kept moderately warm, that the eruption may not be suppressed.

The next variety of rashes are those denominated *milk-blotches*. It generally occurs in infants of an irritable skin, and appears most commonly on the forehead, and the scalp, extending half-way over the face, in the form of large loose scabs. In this complaint, very little needs to be done. Where the case, however, is severe, an occasional drain by a blister between the shoulders, or behind the ears, will answer the good purpose of transfer-

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ag contains a sharp acrid liquor,
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rged by the puncture of a needle.
child be costive, the laxatives al-
prescribed will answer every pur-
with the addition of the testaceous
rs: and, if the belly be loose, and
ant low and debilitated, the light
s, previously recommended, will
ssary.

ing.—One of the most critical pe-
infancy is that of toothing. It has
observed, that infants cut their
are readily in winter than in sum-
nd that all children who possess,
y, a loose belly, suffer least from
plaints of this period. The time
ng generally commences between
and tenth months, and the process
at toothing continues till about
or twenty months after birth. The
mber of the teeth at this time cut
n. The process begins in the low-
wo of the front, or middle teeth,
lly first cut, which are followed
wo corresponding ones in the up-
; next, after some intermission,
r four adjoining teeth; then fol-
wo double-teeth, or grinders, at
rval of some weeks; then the
he lower jaw called canine, or
h; and, lastly, the two corre-
g ones in the upper jaw, called the
h. About the seventh year ap-
new set of teeth; and about the
th, the two inner grinders, or wis-
eth. Though this be the usual pro-
protrusion in strong healthy chil-
et in those more debilitated, the
s is both slower and more irregular.
toothing, as a species of inflamma-
ase, is to be treated as such. Be-
eping the body open by gentle pur-
as well as by clysters, especially
here is a retention of urine, the
ould be relaxed, and gentle sweats
ed by diluting drinks, and also by
ering small quantities of tartaris-
monial wine, or James's powders.
arge should likewise be encoura-
a blistering-plaster behind the
on the back; and, on the first ap-
e of inflammation, a leech should
ied under each ear. A moderate
s, being beneficial in toothing,
ather be encouraged than check-
bing the gums with a little fine
hree or four times a day, and giv-
child a crust of bread, roll of li-
root, wax-candle, or coral, to in-
e disposition for chewing which
ents itself, will afford ease.

uent attendant upon dentition is
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proceeds from the teeth cutting
he nervous membrane covering
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most dangerous symptoms have
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lsions are either symptomatic,
d by worms or dentition, or pre-
of the measles, small pox, or
ptive fever; in which case, they
are not necessarily to be regarded in an unfavourable view; or they are an original complaint arising from a morbid affection of the brain, or nervous fluid. Whatever stimulates the nerves in an immoderate degree may induce convulsions, as may also an irritation of the stomach or bowels. The children are likewise not unfrequently afflicted with convulsions from foul air, and want of cleanliness in their skin and dress.

In convulsions arising from the irritation or foulness of the stomach and bowels, these must be cleansed, after which if they appear to continue, spasmodic remedies must be administered, such as sprit of hartshorn, tincture of castor, rectified oil of amber, or two or three drops of laudanum. Bathing the feet in warm water, and friction all over the body, with camphor liniment, are likewise very useful.

When convulsion is a primary disease, proceeding immediately from the brain, bleeding, blistering, and purging, are requisite; and also bathing the feet in warm water, friction of the legs, and rubbing the soles of the feet with the compound spirit of ammonia.

In most cases of convulsions an immediate and proper application will seldom fail to relieve the child. Where the irritation proceeds from the bowels, the readiest remedy will be a soap clyster, with two or more tea-spoonfuls of salt, and afterwards the purgatives as before directed. But when the child falls suddenly into a convulsion, after sucking or feeding, and the bowels have been before regular, the irritation may be supposed to exist in the stomach; especially when there is an unusual paleness indicating sickness, or a considerable blackness with an appearance of suffocation. Here, some immediate means may be tried to produce vomiting, as irritating the gullet with the finger or a feather, or throwing in a little smoke of tobacco.

Hydrocephalus or *watery head*, is divided into external and internal. In the former the fluid lies on the brain; in the latter, much deeper, and within the ventricles, which, from the mass of water they contain are much swelled, and often distend, to a monstrous size, the entire cranium.

External hydrocephalus, is generally a very fatal disorder. A succession of blisters to different parts of the cranium, offers the best chance of cure.

Internal hydrocephalus seldom takes place before two, or after ten or twelve years of age. It may proceed from external injuries, from schirrous tumours, and excrescences within the skull; from a watery state of the blood, a diminished secretion of urine, a suddenly checked perspiration, or some lingering disease. In young children it frequently begins with cough, a quick pulse, difficult respiration, flushed cheeks, a discharge from the nose and eyes, with continual heat and costiveness. The child often puts its hand to its head; and, during sleep, picks its nose, and grinds its teeth; the eyes are impatient of light, the vision imperfect, the countenance unmeaning, the hands tumid, and the fingers clinched. The mercurial ointment. Strong sneezing powders, as white hellebore, or the compound powder of asarum, have often been recommended as well as electricity; fox-glove too has been known to succeed, in conjunction, as it should, in this disease, always be given, with small doses of calomel.

Rickets. These generally show themselves, between six months and two years of age. They are often apt to arise from unhealthy parents, or from an improper nursing of children themselves, especially from their being kept wet, dirty, in a close damp air, and without due exercise.

The disease first shows itself in a softness and flabbiness of the flesh; the child's countenance becomes bloated, or very florid, the belly and head enlarged, and the body debilitated; the pulse is quick and feeble, and the appetite and digestion bad. The teeth frequently rot early, and fall out; the wrists and ancles become unusually thick; the spine, or back-bone, assumes an unnatural shape; the breast is often deformed and the bones of the arms and legs grow crooked.

Weakness and relaxation being the cause of this disorder, its remedy must, of course, consist in promoting digestion, and in bracing and strengthening the solids. Hence nourishing, and especially animal food, with a little port wine, is the proper diet. Air and exercise are indispensably necessary; the cold-bath will be of essential service. Frictions afterwards with flannel and aromatic powders or liniments, or the fumes of frankincense, mastic, or amber, especially on the back and belly, will contribute to strengthen the habit. Bark, columbo, steel, and tincture of myrrh, are also to be recommended where they can be employed. If the child be of a gross habit, gentle emetics, with warm and active aperients, will be of use; it being necessary to reduce the tympanum of the belly and to strengthen the action of the intestinal canal

lement, by which any quan-
s or decreases, is supposed
tely small, and is generally
y two or more terms, some of
nfinitely less than the rest,
neglected as of no impor-
maining terms form what is
difference of the proposed
The terms that are neglected
ner, as infinitely less than
rms of the element, are the
which arise in consequence
eration or retardation of the
notion, during the infinitely
n which the element is gene-
hat the remaining terms ex-
ements that would have been
that time, if the generating
continued uniform: there-
lifferences are accurately in
tio to each other as the gene-
ons or fluxions. And hence,
his method infinitesimal parts
ents are neglected, the con-
accurately true without even
small error, and agree pre-
hose that are deduced by the
fluxions.
to render the application of
easy, some analogous prin-
dmitted, as that the infinitely
nts of a curve are right lines,
rve is a polygon of an infinite
sides, which being produced
gents of the curve; and by
tion to each other measure
re. This is as if we should
hen the base flows uniformly,
e flows with a motion which
or every infinitely small part
l increases or decreases by in-
all differences at the end of
time.
ver convenient this principle
must be applied with caution
various occasions. It is usual
n many cases, to resolve the
the curve into two or more
nall right lines; and sometimes
ary, if we would avoid error,
t into an infinite number of
ines, which are infinitesimals
nd order. In general it is a
in this method, that we may
the infinitesimals of any order
as we find it necessary; by
ns any error that may arise
ication of it may be discovered
ted by a proper use of this
elf. See *Fluxions.*
IMATION. See *Medicine* and

IMATION, a combustion at-
th flame. See *Chemistry* and

. inflammation.—The heat pro-
iction, the slaking of lime, the
on of hay, dunghills, &c. are
s. Many vegetable substances,
d and heaped together will heat,
at last burn in a flame. A mix-
eed of rape oil, with almost any
ble fibre, as hemp, cotton,
c. and still more if united to
bonaceous matters, will in
warm place, burst out into a
aten flour and charcoal re-

duced to powder, and heated in large quantities have been likewise known to take fire spontaneously.

INFLECTION, or *point of inflection*, in the higher geometry, is a point where a curve begins to bend a contrary way. See *Flexure.*

To determine the point of inflection in curves, whose semi-ordinates CM, C*m*, are drawn from the fixed point C; suppose C M to be infinitely near C *m*, and make *m* H = M *m*; let T *m* touch the curve in M. Now the angles C *m* T, C M *m*, are equal; and so the angle C *m*H, while the semi-ordinates increase, does decrease, if the curve is concave towards the centre C, and increases if the convexity turns towards it. Whence this angle, or which is the same, its measure will be a minimum or maximum, if the curve has a point of inflection or retrogression; and so may be found, if the arch T H, or fluxion of it, be made equal to 0, or infinity. And in order to find the arch T H, draw *m* L, so that the angle T *m* L be equal to *m* C L; then if C*m* = *y* *mr* = *x*, *m*T = $\dot{t}$, we shall have $y : \dot{x} :: \dot{t} : \frac{\dot{t}\dot{x}}{y}$. Again draw the arch H O to the radius C H; then the small right lines *m r* O H, are parallel; and so the triangles O L H, *m* L *r*, are similar; but because H I is also perpendicular to *m* L, the triangles LHI, *m* L *r*, are also similar: whence $\dot{t} : \dot{x} :: y : \frac{\dot{x}\ddot{y}}{t}$; that is, the quantities *m* T, *m* L, are equal. But H L is the fluxion of H *r*, which is the distance of C *m* = *y*; and H L is a negative quantity, because while the ordinate C M increases, their difference *r* H decreases; whence $\dot{x}r + \dot{y}y - \dot{y}\dot{y} = 0$, which is a general equation for finding the point of inflection or retrogradation. See *Fluxions.*

INFLECTION, in grammar, the variation of nouns and verbs, by declension and conjugation.

INFLORESCENCE, in botany, a term used to denote the mode of flowering; the manner in which flowers are supported on their footstalks.

INFLUENZA, in medicine, a species of contagious catarrh, so named because it was supposed to be produced by a peculiar influence of the stars.

IN FORMA PAUPERIS. When any man who has a just cause of suit, either in Chancery or any of the courts of common law, will come before the lord keeper, master of the rolls, either of the chief justices, or chief baron, and make oath, that he is not worth five pounds, his debts paid; either of the said judges will, in his own proper court, admit him to sue in *forma pauperis*, or as a poor man, and he shall have counsel, clerk, or attorney assigned him, to do his business, without paying any fees.

INFORMATION, in law, may be defined an accusation or complaint exhibited against a person for some criminal which, though the king is the nominal prosecutor, yet it is at the relation of some private person or common informer. When an information is filed in either of these ways, it must be tried by a petit jury of the county where the offence arises; after which if the defendant be found guilty, he must resort to the court of King's Bench for his punishment. Common informers are to pay costs in case of failure of suit upon informations, unless the judge certifies that there was a reasonable cause for prosecuting.

INFUSION, in chemistry, is the maceration of any substance in water, or any other liquid, hot or cold, in order to extract its soluble parts. The liquid thus impregnated is called an infusion. See *Pharmacy*.

INFUSORIA, in natural history, the fifth order of the class vermes, in the Linnæan system. They are simple microscopic animalcules. There are three divisions:

A, with external organs, of which there are five genera, viz. branchionus, cercaria, leucopera, trichoda, and vorticella.

B, without external organs, flattened; four genera: colpoda, cyclidium, gonium, and paramecium.

C, without external organs, round; six genera: bacillaria, bursaria, enchelis, monas, vibria, and volvox.

This order, infusoria, is scarcely distinguished from the intestina and mollusca, by any other character than the minuteness of the individuals belonging to it, and their spontaneous appearance in animal and vegetable infusions, where we can discover no traces of the manner in which they are produced. The process by which their numbers are sometimes increased, is no less astonishing than their first production. Several of the genera often seem to divide spontaneously into two or more parts, which become new and distinct animals.

INGOT, in the arts, is a small bar of

eldest only shall in
altogether. 4. The
infinitum, of any
represent their an
grand-child, or gre
male or female) of
before the younger
5. On failure of li
seized, the inherit
the blood of the fir
collateral heir of t
must be his next c
the whole blood. 7.
tances the male sto
to the female, un
descended from a fe
INHIBITION, a w
from proceeding in
before him.
INJECTION, in
throwing certain l
the body, by means
clyster-pipe, or the
INJECTION, a
the vessels with som
in order to make th
fications visible.
INJUNCTION, in
writ, restraining a
ting or doing a thing
against equity and
junction is usually g
of preserving prope
ing a suit, as to restra
proceeding at the
the plaintiff, or fro
or doing any injurio
INK, *common wri*
of a proper consist
from the pen, of a fu
manent as to rem
years without mater
ing illegible, dries w
ing with it, and do
corrode or soften th
ing receipt for the c
given by Dr Lewis,
veral experiments;
glass bottle, or any

ated, white wine, or vinegar
may be used.
nk be wanted for use in a very
, the galls and logwood may be
half an hour in the water, ad-
ttle more to supply the waste,
lecoction while hot strained off
cloth, and the gum arabic and
nd the sulphate of iron, both in
der, added to the decoction
he bottle and shaken. Ink kept
bottle is always rather pale;
ckens by exposure to air in a
; and probably in this way the
omewhat more durable than if
ought by previous exposure to
our at once.
nders ink slow in drying. Ad-
taken of this property in ena-
give one, and sometimes two
s on soft paper, when strongly
A little sugar is mixed with the
riting-sheet is laid on the copy-
a blank sheet of porous and
aper is put over it, and by the
of the machine a perfect fac-
he writing is struck off.
nes the ink of very old writings
h faded as to be illegible. The
ght be restored by pencilling
with a solution of prussiate of
d then with a dilute acid, either
or muriatic; or else, *vice versa*,
the acid, and then with the
If this be done neatly, and
aper laid over the letters as fast
come visible, their form will be
ery distinctly. Pencilling over
with an infusion of galls also
he blackness to a certain de-

ckness of common ink is almost
and irrevocably destroyed by
riatic acid. To prevent this
ditions have been proposed to
nk, of which by far the best is
k or charcoal, in impalpable
The lamp-black should be of
nly kind. About a quarter of
t of the vitriol used will be suf-
This will not fade by age.
hina or *Indian*. The ink is
er in small oblong cakes, which
ecome diffused in water by
nd the blackness remains sus-
it for a considerable time. Dr.
examining this substance,
it consisted of a black sedi-
soluble in water, which ap-
be of the nature of the finest
k, and of another substance so-
ter, and which putrified, and
porated left a tenaceous jelly
r isinglass. It appears proba-
ore, that it may be imitated by
y fine jelly, like isinglass or
the finest lamp-black, and in-
g them thoroughly.
nter's. This composition par-
h of the nature of an oil varnish,
g from it in the quality of ad-
ly to moistened paper, and in
considerable degree soluble in
r. It is when used by the
f the consistence of rather thin
t it may be smeared over the
ly and thinly, when applied by
ions, and it dries very speedi-
ly on the paper without running through to the other side, or passing the limits of the letter.

The following is the method of making printer's ink. Ten or twelve gallons of nut-oil are set over the fire in a large iron pot, and brought to boil. It is then stirred with an iron ladle, and whilst boiling, the inflammable vapour rising from it either takes fire of itself or is kindled, and suffered to burn in this way for about half an hour, the pot being partially covered so as to regulate the body of the flame, and consequently the heat communicated to the oil. It is frequently stirred during this time, that the whole may be heated equally, otherwise a part would be charred, and the rest left imperfect. The flame is then extinguished by entirely covering the pot. The oil by this process has much of its unctuous qualities destroyed, and when cold is of the consistence of soft turpentine, and is then called varnish. After this it is made into ink by mixture with the requisite quantity of lamp-black, of which about two ounces and a half are sufficient for sixteen ounces of the prepared oil. The oil loses by the boiling about an eighth of its weight, and emits very offensive fumes. Several other additions are made to the oil during the boiling, such as crusts of bread, onions, and sometimes turpentine. These are kept secret by the preparers. The addition of a little fine indigo in powder improves the beauty of the colour.

Red printer's ink is made by adding to the varnish, about half its weight of vermilion. A little carmine improves the colour.

INKS, *coloured*. The preparation of these is very simple, consisting either of decoctions of the different colouring or dying materials in water, and thickened with gum-arabic, or of coloured metallic oxides or insoluble powders, merely diffused in gum-water. The proportion of gum arabic to be used may be the same as for black writing ink.

INK, *red*, is usually made by boiling about two ounces of Brazil wood in a pint of water, for a quarter of an hour, and adding to the decoction the requisite quantity of gum, and about half as much alum. Probably a little madder would make it more durable.

INK, *blue*, may, be made by diffusing Prussian blue or indigo through strong gum-water.

INK, *yellow*, may be made by a solution of gamboge in gum water.

Most of the common water-colour cakes diffused in water, will make sufficiently good coloured inks for most purposes.

INKS of other colours may be made from a strong decoction of the ingredients used in dying, mixed with a little alum and gum arabic.

On many occasions it is of importance to employ an ink indestructible by any process, that will not equally destroy the material on which it is applied. Mr. Close has recommended for this purpose 25 grains of copal in powder dissolved in 200 grains of oil of lavender, by the assistance of gentle heat, and then mixed with $2\frac{1}{2}$ grains of lamp black and half a ed to the liquor, so as to render it slightly acidulous, the same purpose will be answered.

Mr. Haussman has given up some compositions for marking on cotton or linen, previous to their being bleached, which are capable of resisting every operation in the processes both of bleaching and dying, and consequently might be employed in marking linen for domestic purposes. One of these consists of asphaltum dissolved in about four parts of oil of turpentine, and with this is to be mixed lamp black, or black lead in fine powder so as to make an ink of a proper consistence for printing with types. Another, the blackest sulphate left after expelling the oxygen gas from oxide of manganese with a moderate heat, being dissolved and filtered, the dark grey basis oxide left on the filter to be mixed with a very little solution of gum tragacanth, and the cloth marked with this is to be dipped in a solution of potash or soda, mild or caustic, in about ten parts of water.

Sympathetic Inks.—With these the writing is invisible, until some reagent gives it opacity. 1. If a weak infusion of galls be used, the writing will be invisible till the paper is moistened with a weak solution of sulphate of iron. It then becomes black. 2. If paper be soaked in a weak infusion of galls, and dried, a pen dipped in the solution of iron will write black on that paper, but colourless on any other paper. 3. The diluted solutions of gold, silver, or mercury, remain colourless upon the paper, till exposed to the sun's light, which gives a dark colour to the oxides, and renders them visible. 4. Most of the acids or saline solutions being diluted, and used to write with, become visible by heating before the fire, which concentrates them, and assists their action on the paper. 5. Diluted prussiate of potash affords blue letters when wetted with the solution of sulphate of iron. 6. The solution of cobalt in aqua

head, the hostler may sell him upon the
reasonable apprasement of four of his
neighbours; yet he cannot justify the tak-
ing him to himself at the price it was ap-
praised at.

INNATE *ideas*, those supposed to be
tamped on the mind from the first mo-
nent of its existence, and which it con-
tantly brings into the world with it: a
octrine which Mr. Locke has abundant-
refuted.

INNOMINATA *ossa*, three bones, which
mpose the extreme part of the trunk of
uman body.

NNUENDO, is a word used in declara-
s and law pleadings, to ascertain a
son or thing which was named before;
say he (innuendo the plaintiff) did so
so, when there was mention before
nother person. Innuendo may serve
n explanation, where there is prece-
matter, but never for a new charge;
y supply what is already expressed,
annot add or enlarge the importance

CARPUS, in botany, a genus of the
dria monogynia class and order.
al order of dumosæ. Sapotæ, Jus-
Calyx bifid; corolla funnel-form;
s in a double row; drupe one-
. There is but one species, viz. I.
a native of the South Sea Islands.

CULATION, in medicine, the art
planting a distemper from one
o another, by incision, particular-
or ingrafting the small-pox. See
ion.

ULATION, or Budding. See

THUS, in mineralogy, a stone
of carbonate of lime, carbonic
and a little iron; entirely solu-
ric acid with effervescence;
rasitic, soft, lightish, breaking
erminate fragments. There are
ecies: of the filamentosius
hree varieties; the satin spar,
from its rich satiny lustre, is
ssia, Poland, Germany, Saxo-
hemia, with the fibres straight
curved. It is found also about
Alston in Cumberland, wash-
er Tyne, near the level of its
white, with sometimes a rosy
diluted oxide of iron, and
ht from the edges, or in thin-
fracture in the direction of
us, straight or curved; spe-
bout 2. 71, contains carbo-
rbonate of lime 50, water
on 2, and a small portion of

TE *proportion*, is where
e magnitudes in one rank,
s proportional to them in
u compare them in a dif-
hus, suppose the numbers
e 2, 3, 9, and those of the
36; which are compared
er, viz. 2 : 3 :: 24 : 36;
24. Then rejecting the
ach rank, you conclude

law, an inquisition by

in law, a manner of
rch or examination on

the king's behalf, in cases of outlawry, self-murder, to discover lands, goods, &c. forfeited to the crown. Inquisition is also had upon extents of lands, tenements, &c. writs of elegit, and where judgment being had by default damages and costs are recovered.

INQUISITION, in the church of Rome, a tribunal in several Roman catholic countries, erected by the popes for the examination and punishment of heretics.

INROLLMENT, in law, is the registering, recording, or entering in the rolls of the Chancery, King's Bench, Common Pleas, or Exchequer, or by the clerk of the peace in the records of the quarter sessions, of any lawful act; a statute or recognizance acknowledged, a deed of bargain and sale of lands, and the like. By statute 27 Henry VIII. c. 16, no lands shall pass, whereby any estate of inheritance or freehold shall take effect, or any use thereof be made, by reason only of any bargain and sale thereof, except the bargain and sale be made by writing indented, sealed, and within six months inrolled in one of the king's courts of record at Westminster; or else within the county where the lands lie, before the clerk of the peace, and one or more justices. But by 5th Elizabeth, c. 26, in the counties palatine, they may be inrolled at the respective courts there, or at the assizes. Every deed before it is inrolled is to be acknowledged to be the deed of the party, before a master of chancery, or a judge of the court wherein it is inrolled, which is the officer's warrant for inrolling it: and the inrollment of a deed, if it be acknowledged by the grantor, will be a good proof of the deed itself upon trial.

INSCRIBED, in geometry. A figure is said to be inscribed in another, when all its angles touch the sides or planes of the other figure.

INSCRIPTION, a title or writing carved, engraved, or affixed to any thing, to give a more distinct knowledge of it, or to transmit some important truth to posterity.

INSECTS, in natural history. See *Entomology*.

Insects are not furnished with red blood, but instead of it their vessels contain a transparent lymph. They are destitute of internal bones; but, in place of them, are furnished with a hard external covering, to which the muscles are attached, which serves them both for skin and bones; they are likewise without a spine formed of vertebræ. They are furnished with articulated legs, six or more. A very great number of insects undergo a metamorphosis, which takes place in all the winged insects. They frequently change their skin in the progress of their growth. A very great number of insects are furnished with jaws placed transversely. The wings, with which a very great number of insects are furnished, distinguish them from all other animals which are not furnished with a spine composed of vertebræ. Insects are generally oviparous, scorpions and aphides during the summer months are viviparous. Incubation is not necessary for hatching portion of gelatine. The muscles of insects consist of fibres formed of fasciculi; there are commonly but two muscles to produce motion in any of their limbs, the one an extensor, the other a flexor. These muscles are commonly attached to a tendon, composed of a horny substance, connected to the part which they are destined to put in motion. In most insects the brain is situated a little above the œsophagus; it divides into two large branches, which surround the œsophagus, and unite again under it, from which junction a whitish nervous cord proceeds corresponding to the spinal marrow of the superior animals, which extends the whole length of the body, forming in its course twelve or thirteen nots or ganglions, from each of which small nerves proceed to different parts of the body. It appears pretty evident that they possess vision, hearing, smell, and touch; as to the sense of taste we are left to conjecture, for we are acquainted with no facts, by which we can prove that insects do not enjoy the sense of taste. The eyes of insects are of two kinds; the one compound, composed of lenses, large and only two in number: the other are small, smooth and vary in number; from two to eight. The small lenses which form the compound eyes are very numerous; they amount in some insects, to many hundreds. The far greater number of insects have only two eyes, but some have three, some four, some six, some eight. The eyes of insects are commonly immovable. Their ears have been discovered at the root of their antennæ, and can be distinctly seen in some of the larger kinds, as the lobster. The faculty of smelling is the most perfect of all their senses. Beetles, of various sorts, the different species of dermestes, flies, &c. perceive at a considerable distance the smell

ceed from the
composed of
are tubes form
spiracula are d
vered with a
opening in the
which is furnis
threads to preve
neous bodies.

Insects are
vertebræ, in w
guished. All in
female, except
the order Hym
always smaller
lours of the m
more brilliant
in some insects,
totally different
the antennæ of
of a different fo
of the female:
furnished with
have none; the
with a sting, wh
of one; the male
nished with shar
sembling horns
head or breast, w
ceptible or very
female. The part
tion afford the be
in most insects the
extremity of the re

The eggs of inse
first membranace
the tortoise, and th
other covered with
the birds; their fig
eggs of many insect
ing hatched during
the young insects d
them, till the seaso

te man himself. Many species of crab, viz. lobster, common crab, shrimp, prawn, land-crab, &c. are reckoned delicacies. The larvæ of some coleopterous insects and locusts form part of the food of man. Insects, likewise, by consuming decayed animal and vegetable matter, which, if left to undergo the putrefactive process, on the surface of the ground, might taint the atmosphere with pestilential vapours, preserve the air pure for the respiration of man and other animals.

INSERTION, in anatomy, the close con- nction of the vessels, tendons, fibres, d membranes of the body with some her parts.

INSOLATION, in chemistry, a term de- ting exposure to the sun, to promote the emical action of one substance upon other.

NSOLUBILITY, in chemistry. The in- bility of a substance in a fluid, which he medium of chemical action, has influence on that action, somewhat lar to that of cohesion, and is no- g but a modification of it, in relation he fluid in which it is exerted.

NSOLVENT *debtors*. Insolvent acts statutes passed for the purpose of re- ng from prison, and sometimes from debts, persons whose transactions not been of such a nature as would ct them to the bankrupt laws.

PIRATION, among divines, &c. s the conveying of certain extraor- and supernatural notices or mo- nto the mind; or it denotes any tural influence of God upon the a rational creature, whereby he is to any degree of intellectual im- ents, to which he could not, or e, in fact, have attained in his circumstances, in a natural way. prophets are said to have spo- vine inspiration. thors reduce the inspiration of writers to a particular care of , which prevented any thing d from failing or coming to aintaining, that they never inspired either with know- ression. According to others, no more than a direction of irit, which never permitted riters to be mistaken. It is a sion, that the inspiration of g regards only the matter, not ords.

NT, the establishing a person ry. It is chiefly used for the a dean, prebendary, &c. It for the ceremony whereby the garter are placed in their hapel of St. George, Wind- times termed *installation*.

such a part of duration rceive no succession; or it kes up the time only of one nds.

n appellation given to the ural inclinations of brutes, he place of reason in man-

in literary history, a book elements of the Roman ting the last part of the

INSTITUTION to a benefice, is whereby the ordinary commits the c of souls to the parson presented, as induction he obtains a temporal right the profits of the living.

INSULATED, in electricity, a term a plied to bodies that are supported by ele trics, or non-conductors, so that their con munication with the earth, by conductin substances, is interrupted.

INSURANCE, *laws of*. By the statut 14 Geo. III. c. 48. no insuranc shall be made on lives, or on any othe event, wherein the party insured hath no interest; and in all policies the name of such interested party shall be inserted, and nothing more shall be recovered thereon than the amount of the interest of the insured. This however does not extend to marine insurances. But as it was a common practice of insuring large sums without having property on board, and which were called wager policies or insurances, interest or no interest, and of insuring the same goods several times over, it was enacted, that all insurances, interest or no interest, or without further proof of the interest than the policy, or by way of gaming, or without benefit of salvage to the insurer, should be void, except on privateers, or on ships or goods from the Spanish or Portuguese dominions: and that no re-assurance shall be legal, unless the former insurer be insolvent or dead; and that in the East India trade the lender of money on bottomry, or ad respondentia, shall alone have a right to be insured for the money lent; and the borrower shall recover no more upon any insurance than the surplus of his bottomry or respondentia bond. No insurance can be made on an illegal voyage. It is generally stipulated in policies that the insurer shall not be answerable for any partial loss on certain articles, but on others less difficult to be preserved at sea, but liable to partial injuries, shall be liable for any partial loss above five per cent.; and as to all other goods, and the ship and freight, he shall only be liable for such losses above three per cent. But he is liable on all losses, however small, called general average or losses occasioned by the ship stranding; but this loss must be an immediate, not a remote, consequence of the stranding. The commencement of the risk on the ship varies in most cases, and usually continues till the ship has been 24 hours at safe anchor. Upon goods it commences when they are on board, and continues till they are removed or landed. The ship insured must be fit to bear the sea, and perform the voyage; and if she deviates from the usual course, and stops at places not usually stopped at, without a proper cause, the contract is void.

Insurance upon life. See *Assurance*.

INTAGLIOS, precious stones on which are engraven the heads of great men, inscriptions, and the like.

INTEGER, in arithmetic, a whole number, in contradistinction to a fraction.

INTEGRAL, or *integrant*, in philosophy, appellations given to parts of bodies which are of a similar nature with the whole.

INTEGRAL *calculus*. See *Calculus*.

INTEGUMENTS, in physiology, the

common coverings which invest the body, as the skin, with the fat and cellular membrane. It is also the term of the body.

INTENSITY, in physics, is the degree or rate of power or energy of any quality, as of heat and cold. The intensity of qualities, as gravity, light, heat, &c. vary in the reciprocal ratio of the squares of the distances from the centre of the radiating quality.

INTERCALARY. See *Bissextile.*

INTERCEPTED *axis,* See *Abscissa.*

INTERCOMMONING, in law, is when the commons of two manors lie together, and the inhabitants of both have, time out of mind, caused their cattle to feed promiscuously on them.

INTERCOSTAL. See *Anatomy.*

INTERDICT, an ecclesiastical censure, by which the church of Rome forbids the performance of divine service in a kingdom, province, town, &c.

INTEREST, an allowance or compensation for the loan or use of a sum of money for a certain time, according to a fixed rate or proportion. The rate of interest varies in different countries, and at different times, according to the scarcity or plenty of money, and the security of lending; in most commercial states it has been thought necessary to establish by law a fixed rate of interest for the use of money; this restriction, however, must nearly correspond with the current rate of interest, for if it be attempted to reduce by law the common rate of interest below the lowest ordinary market rate, the restriction will be generally evaded. The last act of parliament for regulating the interest of money was 12th Anne, st. 2. c. 16, by which it was fixed at 5 per cent. per annum. Interest is generally payable yearly, half-yearly, or quarterly, and is distinguished into *simple* and *compound.*

INTEREST *simple,* is the compensation paid for the use of a capital, at a certain fixed rate for a year, and a proportionately greater or less sum for a greater or less time. If 5*l.* is the interest of 100*l.* for a year, $\frac{5}{100}$, or .05, is the interest of 1*l.* for the same term: for, as $100 : 5 :: 1 : \frac{5}{100}$. Let then the interest of 1*l.* for one year $= r$; the principal $= p$; the time $= t$; the amount in the said time, viz. principal and interest $= a$. Then r being the interest of 1*l.* for one year, the interest of 1*l.* for two years will be $2r$; for three years, $3r$; and for any number of years, tr. Now, as one pound is to its interest, so is any given principal to its interest, or

As $1 : tr :: p : ptr =$ i
Then the principal being
terest, their sum will be =
required; which gives the
rems for answering all q
ing to simple interest, viz
If principal, time, and
to find the amount.

Theo. 1. $ptr + p$

If the amount, time, and
to find the principal?

Theo. 2, $\frac{a}{tr+1} =$

If the principal, amount,
given to find the rate?

Theo. 3. $\frac{a-p}{pt} =$

If the principal, amount,
given, to find the time?

Theo. 4. $\frac{a-p}{pr} =$

Ex. 1. What sum will one p
to in 1808 years, if put out
per cent. per annum?
Multiply .004166 by 18
the product is 37.06,
to the principal, give
7*s.* 7$\frac{1}{4}$*d.*

Ex. 2. What sum will am
in seven years, at 4 per cent
Multiply 7 by .04 and
makes 1.28; divide
sum, and the quotient
78*l.* 2*s.* 6*d.*

Ex. 3. At what rate per c
num, will 100*l.* amount to
years at simple interest?
Substract 100*l.* from 14
mainder is [illegible] 10*s.*
by the product of the p
time, or 700, gives
cent.

Ex. 4. In what time will 1
212*l.* 10*s.* at simple interest
per annum?
Substract 125*l.* from 212
mainder is 87*l.* 10*s.*
by the product of the
rate, or 6.125 gives
years.

The interest of any sum
found by dividing the ann
365; thus, at 5 per cent. the
for one day is . . . .
which multiplied by 2 gives
interest for 2 days . . . . . .
by 3. . . 3 days . . . . .
and by proceeding in this
following table is easily form

9	30	.0041095	56	.0076712	81	.0110958
9	31	.0042465	57	.0078082	82	.0112328
9	32	.0043835	58	.0079452	83	.0113698
9	33	.0045205	59	.0080821	84	.0115068
8	34	.0046575	60	.0082191	85	.0116438
8	35	.0047945	61	.0083561	86	.0117808
8	36	.0049315	62	.0084931	87	.0119178
8	37	.0050684	63	.0086301	88	.0120547
8	38	.0052054	64	.0087671	89	.0121917
8	39	.0053424	65	.0089041	90	.0123287
8	40	.0054794	66	.0090411	91	.0124657
7	41	.0056164	67	.0091780	92	.0126027
7	42	.0057534	68	.0093150	93	.0127397
7	43	.0058904	69	.0094520	94	.0128767
7	44	.0060274	70	.0095890	95	.0130137
7	45	.0061643	71	.0097260	96	.0131506
7	46	.0063013	72	.0098630	97	.0132876
7	47	.0064383	73	.0100000	98	.0134246
7	48	.0065753	74	.0101369	99	.0135616
6	49	.0067123	75	.0102739	100	.0136986
6	50	.0068493	76	.0104109	200	.0273972
6	51	.0069863	77	.0105479	300	.0410958
6	52	.0071232				

the interest of 250*l.* for

250 = 2*l.* 3*s.* 1¾*d.*

r any number of days not
able may be easily found
the numbers contained

the interest of 115*l.* for

of 1*l.* for 200 days is
nd for 37 days .0050684,
d together make .0324656;

115 = 3*l.* 14*s.* 8*d.* = the
quired.

Anne, no person is to

$1 : r :: r^3 : r^4$ the amount of 1*l.* in 4 years, &c.

Whence it appears, that r raised to the power whose exponent is the given number of years, or r^n, will be the amount of 1*l.* in those years; and as

$$1l. : r^n :: p : a$$

from which the following theorems are easily deduced, viz. if the principal, time, and rate of interest are given, to find the amount?

Theo. 1. $p \times r^n = a$

If the amount, time, and rate are given,

1	1.05	26	3.555672	51	12.040769
2	1.1025	27	3.733456	52	12.642808
3	1.157625	28	3.920129	53	13.274948
4	1.215506	29	4.116135	54	13.938696
5	1.276281	30	4.321942	55	14.635630
6	1.340095	31	4.538039	56	15.367412
7	1.407100	32	4.764941	57	16.135783
8	1.477455	33	5.003188	58	16.942572
9	1.551328	34	5.253347	59	17.789700
10	1.628894	35	5.516015	60	18.679185
11	1.710339	36	5.791816	61	19.613145
12	1.795856	37	6.081406	62	20.593802
13	1.885649	38	6.385477	63	21.623492
14	1.979931	39	6.704751	64	22.704667
15	2.078928	40	7.039988	65	23.839900
16	2.182874	41	7.391988	66	25.031895
17	2.292018	42	7.761587	67	26.283490
18	2.406619	43	8.149666	68	27.597664
19	2.526950	44	8.557150	69	28.977548
20	2.653297	45	8.985007	70	30.426425
21	2.785962	46	9.434258	71	31.947746
22	2.925260	47	9.905971	72	33.545134
23	3.071523	48	10.401269	73	35.222390
24	3.225099	49	10.921333	74	36.983510
25	3.386354	50	11.467399	75	38.832685

Ex. 1. What sum will 500*l.* increase to in 21 years, if improved at 5 per cent. compound interest?

500 × 2.785962 = 1392*l.* 19*s.* 7¼*d.*

Ex. 2. What sum, if improved at 5 per cent. compound interest, will accumulate to a million in 50 years?

$$\frac{1000000}{11.467399} = 87203l.\ 14s.\ 8d.$$

The increase of an annuity, if forborne for a given time, may be found by this table in the same manner as the amount of a given sum, for
annuity will becon
tance from the tim
have been due, th
payment must giv
succeeding ones.

Ex. 3. A person t
nuity of 50 guineas
that the same sha
after the expiratio
then allowed an
What must this a

52.5 × 1.34

TABLE,

esent Value of One Pound to be received at the end of any 'ears not exceeding a Hundred, discounting at the Rate of 'ompoand Interest.

Yrs.	Value.	Yrs.	Value.	Yrs.	Value.
26	.281241	51	.083051	76	.024525
27	.267848	52	.079096	77	.023357
28	.255094	53	.075330	78	.022245
29	.242946	54	.071743	79	.021186
30	.231377	55	.068326	80	.020177
31	.220359	56	.065073	81	.019216
32	.209866	57	.061974	82	.018301
33	.199873	58	.059023	83	.017430
34	.190355	59	.056212	84	.016600
35	.181290	60	.053536	85	.015809
36	.172657	61	.050986	86	.015056
37	.164436	62	.048558	87	.014339
38	.156605	63	.046246	88	.013657
39	.149148	64	.044044	89	.013006
40	.142046	65	.041946	90	.012387
41	.135282	66	.039949	91	.011797
42	.128840	67	.038047	92	.011235
43	.122704	68	.036235	93	.010700
44	.116861	69	.034509	94	.010191
45	.111297	70	.032866	95	.009705
46	.105997	71	.031301	96	.009243
47	.100949	72	.029811	97	.008803
48	.096142	73	.028391	98	.008384
49	.091564	74	.027039	99	.007985
50	.087204	75	.025752	100	.007604

n is entitled to receive f seyen years from the at sum paid him immequivalent thereto?

1 = 710*l.* 13*s.* 7$\frac{1}{4}$*d.*

the present worth of 15 years hence?

17 = 107*l.* 0*s.* 6$\frac{1}{4}$*d.*

the present value of e received at the expi-

358942 = 500*l.*

Leases.

lend money at comout in granting or pureither for lives or for a s always usual to comat compound interest.

aw, is usually taken for real, and more particuerm.

money, is the premium f a sum, and is by law, mited strictly to five per See *Usury*.

te is devised for payancery will not allow leuts. *In case of a vest*mediately, and charged ey in the funds, which ate profit, interest shall m from testator's *death.*

Where lands are charged with payment of a sum in gross, they are also chargeable in equity, with payment of interest for such sum.

INTERJECTION, in grammar, an indeclinable part of speech, signifying some passion or emotion of the mind.

INTERLOCUTORY *judgments*, in law, are such as are given in the middle of a cause, upon some plea, proceeding, or default, which is only intermediate, and does not finally determine or complete the suit.

INTERLUDE, an entertainment exhibited on the theatre between the acts of a play.

INTERMEDIATES, in chemistry, a term made use of when speaking of chemical affinity. Oil, for example, has no affinity to water unless it be previously combined with an alkali, it then becomes soap, and the alkali is said to be the intermedium, which causes the union.

INTERNAL, in general, signifies whatever is within a thing. Euclid (lib. i. prop. 32) proves, that the sum of the three angles of every triangle is equal to two right angles; whence he deduces several useful corollaries. He likewise deduces, from the same proposition, this theorem, viz. that the sum of the angles of every rectilinear figure is equal to twice as many right angles as the figure hath sides, excepting or subtracting four.

INTERPOLATION, among critics, a spurious passage inserted into the writings of some ancient author.

tual intersection of two planes is a right line.

INTERVAL, in music, the difference between two sounds, in respect of acute and grave. A simple interval is without parts or divisions. Such are the octave, and all that are within it; as the second, third, fourth, fifth, sixth, and seventh, with their varieties. A compound interval consists of several lesser intervals; such are all those greater than the octaves, as the ninth, tenth, eleventh, twelfth, &c. with their varieties.

INTESTATES. There are two kinds of intestates; one that makes no will at all; and another that makes a will, and nominates executors, but they refuse. The ordinary by special acts of parliament is required to grant administration of the effects of the deceased to the widow or next of kin, who shall first pay the debts of the deceased, and then distribute the surplus among the kindred, in the proportions directed by 22 and 23 Car. II. c. 10.

INTESTINA, in natural history, the first of the five orders of the class vermes, in the Linnæan system. They are of a formation the most simple, being naked animals without limbs. Some live within other animals, some in waters, and a few in the earth. There are two divisions.

A, found within other animals, without eyes; there are fifteen genera, viz. Ascaris, caryophyllæus, cucullanus, echynorhynchus, fasciola, filaria, furia, hæruca, ligula, linguatela, scolex, strongylus, tænia, tricocephalus uncinariæ.

B, not inhabiting the bodies of other animals, these are some with and some without a lateral pore, and others perforated with a lateral pore. There are five species, viz. Gordius, hirudo, lumbricus, planaria, sipunculus, which see. Having omitted *Caryophyllæus*, we insert it here: Body round; mouth dilated and fringed. One species, viz. C. piscium, inhabiting the intestines of various fresh water fish; the body of a clay colour, about an inch

upper side of the

INTRINSIC, a te
ner, real, and genu
&c. of any thing,
extrinsic or appare

INTUITION, an
whereby the mind
ment or disagreeme
diately by themselv
vention of any other
mind perceives the
the light, only by b
it. Thus the mind
is not black, that th
and equal to one an

INVECTED, in he
or furrowed.

INVECTIVE, in r
proof, as the latter
and is intended for
reproved; wherea
work of an enemy,
to vex and give une
against whom it is d

INVENTION, de
ing any thing new,
found. It is used fo
or some what pecul
which leads him to
new; whence we
tion.

INVENTION, in rh
ing out and choosin
the orator is to use f
moving his hearers

INVENTION, in
poet adds to the his
has chosen, as well
gives it.

INVENTION, in
the painter makes o
enter the compositio

IN VENTRE SA
man is with child at
band's death; which
born would be heir
band. A devise to
mere, is good, by w

nsequents, and the con-
ecedents: thus, if
$b :: c : d$
$9 :: 12 : 27$
ion it will be
$a :: d : c$
$4 :: 27 : 12$
in music, is a changed
a subject or of a chord.
subject is produced by
or lower situation among
of a score. The inversi-
hat changed position of
rs, with respect to its
, by which, though the
the same, the intervals

grammar, is where the
are ranged in a man-
as they might be. *It is*
auty either in verse or
ive it from an able hand;
d variety to a sentence,
nd in an agreeable sus-
ation of a marvellous
on.
, in law, is the giving
ds by actual seisin.
ne, in botany, a genus of
olygamia superflua class
ral order of compositæ
mbiferæ, Jussieu. Re-
down simple; anthers
stles at the base. There
ecies; generally herba-

in botany, the name of
Linnæus's "Fragments
hod," consisting of plants
he water. These plants
ous, and mostly peren-
fibrous; stem usually
ts stead an assemblage
, infolding one another,
m the middle of which
oot-stalk of the flower;
s alternate, sometimes
stem; flowers herma-
and on others the male
the same root; the flow-
proceed singly from the
es, as in the ceratophyl-
hippuris: those of the
e myriophyllum, water-
le; those of the upper
nichellia, triple-headed
two flowers in the same
and the other female.
tamogeton, pond-weed,
disposed in specks in the
ves; the flower-cup is
r consists of three, four,
r leaves; the petals are
g, but the elatine and
four; the stamina are in
to sixteen and upwards;
from one to four; the
wanting, as the seed-
ally, except in the ela
dry capsule, with four
, and the same number
generally four seeds;
ophyllum the fruit is a
haped, and containing a

account, in writing, of
merchandise, *with their*
arges, &c. transmitted by one merchant to another in a distant country. One copy of every invoice is to be inserted in the invoice-book, and another must be dispatched to the correspondent. A letter of advice is generally subjoined.

INVOICE *book*, this book is paged, and contains copies of the invoices of goods sent to sea.

INVOLUCRUM. See *Botany*.

INVOLUTIONS. See *Algebra*.

INVOLUTE, *figure or curve*, in the higher geometry, is that which is traced out by the outer extremity of a string, as it is folded or wrapped upon another figure, or as it is unwound from off it.

INVOLUTION. See *Algebra*.

JOINERY, the art of working in wood, or of fitting various pieces of timber together. It differs from the art of the carpenter, inasmuch as the joiner is employed chiefly in the inside work of a house, but the carpenter does the rough work.

JOINT, in general, denotes the juncture of two or more things.

JOINT, *universal*, an invention adapted to all kinds of motions and flexures.

JOINT ACTIONS, in personal actions, several wrongs may be joined in one writ; but actions founded upon a tort and a contract cannot be joined.

JOINT *and several*: an interest cannot be granted jointly and severally.

JOINT *lives*: lease for years to husband and wife, if they or any issue of their bodies should so long live, has been adjudged so long as either the husband, wife, or any of their issue, should live.

JOINT STOCK COMPANIES. Trading associations with a transferable stock, each member being liable only to the amount of the share he holds. All combinations in trade, except partnerships and lawful corporations established by act of parliament or royal charter, are prohibited by the statute 16 Geo. I. c. 18, s. 18, & 21. See *Partnership*.

JOINT TENANTS, are those that hold lands or tenements by one title, without partition. The creation of an estate in joint tenancy depends on the wording of the deed or devise, by which tenant claims title, and cannot arise by act of law. If any estate be given to a plurality of persons, without adding any restrictive, exclusive or explanatory words, this makes them immediately joint-tenants in fee of the lands. If there be two joint-tenants, and one release the other, this passes a fee without the word heirs. Joint-tenants may make partition; the one party may compel the other to make partition, which must be by deed: that is to say, all the parties must by deed actually convey and assure to each other the several estates, which they are to take and enjoy severally and separately. Joint-tenants must jointly implead, and be jointly impleaded with others. If one joint-tenant refuse to join in an action, he may be summoned and severed; but if the person severed die, the writ abates in real actions, but not in personal and mixed actions.

JOINTURE, a jointure, strictly speaking, signifies a joint estate, limited to both husband and wife; but in common acceptation it extends also to a sole estate, It must either be expressed or averred to be in satisfaction of her dower. 6. It should be made during coverture.

JOISTS, in architecture, those pieces of timber framed into the girders and summers, on which the boards of the floor are laid.

JONCQUETIA, in botany, a genus of the decandria tetragynia class and order. Calyx five-leaved; petals five, spreading; filaments growing to a glandule; styles none; capsule sub-globular, one-celled, five-valved, five-seeded. There is but one species, viz. J. guianensis, a large tree, forty to fifty feet high, and about three in diameter with a russet bark, and a white uncompact wood.

IONIC *order*, See *Architecture*.

IONIC *dialect*, in grammar, a manner of speaking peculiar to the people of Ionia.

JONK, or *Jonque*, in naval affairs, is a kind of small ship, very common in the East Indies; about the bigness of our fly boats. Their sails are frequently made of mats, and their anchors of wood.

JOURNAL, a day-book, register, or account of what passes daily. See *Book-keeping*.

JOURNAL, at sea, is a register, kept by the pilot, and others, wherein notice is taken of every thing that happens to the ship, from day to day, with regard to the winds, the rhumbs, the rake, soundings, &c. In sea journals, the day, or twenty-four hours, terminates at noon. The first twelve hours, from noon to mid-night, are marked with P. M. signifying after mid-day; and the second from mid-night to noon, with A. M. signifying after mid-night; so that the ship account is twelve hours earlier than the shore account of time.

JOY, one of the most powerful mental emotions accompanied with an extraordinary degree of animation and pleasure. The effect of joy, if not too violent, invi-

because of its varie
the Latin word for
and *Optics*.
IRIS, in botany,
dria monogynia cla
order of ensatæ.
unequal, petals
spreading stigmas,
two-lipped. The
herbaceous perenn
petalous flowers.
IRON, is a meta
lour; and when p
of brilliancy. It h
emits a smell whe
gravity varies fro
tracted by the mag
itself the substan
the loadstone.
fectly pure, it re
tue a very short
in every temper
bility increases in
perature augmen
hammered out nea
silver, or even co
ever, is more perfe
out into wire as fi
tenacity is such, th
an inch in diamete
ing 549·25lbs. avo
ed to about 158 de
Its texture is fibro
When exposed t
soon tarnished, an
into a brown o
known under th
change takes plac
mosphere is moist
the gradual combi
the oxygen of the
it has a very stro
only two oxides of
usually a black co
red.
The protoxide o
by four different

is oxide combined with
. The red oxide may be
exposing for a long time
of iron in sulphuric acid
e, and then dropping it
which the oxide is pre-
oxide is also found native
ce. It is composed of 48
nd 52 of iron.

annot be decomposed by
eated along with its own
lings, the whole is con-
oxide. It is not mag-
erted into black oxide by
ogen gas and many other
is capable of combining
le combustible bodies.

ire of it constitutes that
name of cold short iron,
ttle when cold, though
ot. Its brittleness and
be removed by heating
mestone.

at many varieties of iron
istinguish by particular
f them may be reduced
er of the three following
; wrought or soft iron ;

g iron, is the name of the
extracted from its ores.
hich iron is usually ob-
sed of oxide of iron and
of the manufacturer is
de to the metallic state,
ll the clay with which it
ese two objects are ac-
ce, by mixing the ore re-
ieces with a certain por-
e and of charcoal, and
hole to a very violent
constructed for the pur.

and by that time the conversion is completed. The heaving is evidently produced by the emission of an elastic fluid. As the process advances, the iron gradually acquires more consistency ; and at last, notwithstanding the continuance of the heat, it congeals all together. It is then taken while hot, and hammered violently, by means of a heavy hammer driven by machinery. This not only makes the particles of iron approach nearer each other, but drives away several impurities which would otherwise continue attached to the iron. In this state it is the substance described under the name of iron. When small pieces of iron are stratified in a close crucible, with a sufficient quantity of charcoal-powder, and kept in a strong red heat for eight or ten hours, they are converted into steel, which is distinguished from iron by the following properties. It is so hard as to be unmalleable while cold, or at least it acquires this property by being immersed while ignited into a cold liquid. It is brittle, resists the file, cuts glass, affords sparks with flint, and retains the magnetic virtue for any length of time. It loses this hardness by being ignited and cooled very slowly ; it melts at above 130 deg. Wedgewood. It is malleable when red hot, but scarcely so when raised to a white heat. It may be hammered out into much thinner plates than iron. It is more sonorous ; and its specific gravity, when hammered, is greater than that of iron. By being repeatedly ignited in an open vessel, and hammered, it becomes wrought iron which is a simple substance, and if perfectly pure would contain nothing but iron.

Steel is iron combined with a small portion of carbon, and has been for that

Natural steel is obtained from the ore by converting it first into cast iron, and then exposing the cast iron to a violent heat in a furnace, while its surface is covered with a mass of melted scoriæ five or six inches deep. Part of the carbon combines with the oxygen, which cast iron always contains, and flies off in the state of carbonic acid gas. The remainder combines with the pure iron, and constitutes it steel.

Iron and carbon are capable of combining together in a variety of different proportions. When the carbon exceeds, the compound is carburet of iron, or plumbago. When the iron exceeds, the compound is steel or cast iron in various states, according to the proportion. All these compounds may be considered as subcarburets of iron. The hardness of iron increases with the proportion of charcoal with which it combines, till the carbon amounts to about $\frac{1}{60}$ of the whole mass. The hardness is then a maximum; the metal acquires the colour of silver, loses its granulated appearance, and assumes a crystallized form. If more carbon is added to the compound, the hardness diminishes in proportion to its quantity.

The affinities of iron, and its oxides, are arranged by Bergman as follows:

Iron.—Nickel, cobalt, manganese, arsenic, copper, gold, silver, tin, antimony, platinum, bismuth, lead, mercury.—*Oxide of Iron.*—Oxalic acid, tartaric, camphoric, sulphuric, saclactic, muriatic, nitric, phosphoric, arsenic, fluoric, succinic, citric, lactic, acetic, boracic, prussic, carbonic.

IRON-SICK, in the sea-language, is said of a ship or boat, when her bolts or nails are so eaten with rust, and so worn away, that they occasion hollows in the planks, whereby the vessel is rendered leaky.

IRRATIONAL, an appellation given to

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int, a native of Europe
n England for he use of
basis of black and many

in botany, a genus of the
ecia class and order. Na-
grasses. Hermaphrodite,
vo-flowered; corolla two-
three: styles three; seed
yx and corolla, as in the
three. There are eight

See *Medicine*,
mineralogy, a species of the
s: it is of an iron-black,
e to the brownest black;
l, obtuse, angular grains,
ces, with a rough glimmer-
terally it is glittering, and
i-metallic. Specific gravi-
s into a blackish-brown

botany, a genus of the her-
nia class and order. Es-
er: calyx coloured, four
; corolla six-cleft, funnel
o-globular, six-celled, ma-
re is but one species, viz. I.
of Cayenne.
used in medicine and do-
y, is a preparation from
air-bladders of fresh-water
l, particularly the huso, a
penser, which *see*.
ort, called book and ordi-
made of the intestines and
e peritonæum of the fish.
which it is composed, are
e fish while sweet and
. washed from their slimy

whence it has its name: and in France, Germany, and many other places.

ISNARDIA, in botany, a genus of the tetrandria monogynia class and order. Natural order of calycanthemæ. Salicariæ, Jussieu. Calyx four-cleft; corolla none; capsule four celled, covered by the calyx. There is but one species, viz. I. palustris.

ISOCHRONAL, *Isochrone*, or *Isochronous*, is applied to such vibrations of a pendulum as are performed in the same space of time.

ISOCHRONAL *line*, that in which a heavy body is supposed to descend without any acceleration.

ISOETES, in botany, a genus of the cryptogamia filices class and order. Natural order of ferns. Essential character; Male, anther within the base of the frond; female, capsule two-celled, within the base of the frond. There are two species.

ISOPERIMETRICAL *figures*, in geometry, are such as have equal perimeters, or circumferences.

Of isoperimetrical figures, that is the greatest that contains the greatest number of sides, or the most angles.

Of two isoperimetrical triangles, having the same base, whereof two sides of one are equal, and of the other unequal, that is the greater whose two sides are equal.

Of isoperimetrical figures, whose sides are equal in number, that is the greatest which is equilateral and equiangular. Thus if one side of a square be 10; and one side of an oblong be 19, and the other 1; then will the ambits of that square and oblong be equal, viz. each 40, and yet the area of the square will be 100, and of the oblong but 19.

ISOPYRUM, in botany, a genus of the

to proceed from too great an irritation, so does itching proceed from a slight one.

ITEA, in botany, a genus of the pentandria monogynia class and order. Natural order of rhododendra, Jussieu. Essential character: capsule two-celled, two-valved, many-seeded; stigma emarginate. There are two species.

ITTRIA, an earth discovered in gadolinite, in which it is combined with silex and lime. It is heavier than any other earth; its specific gravity being 4.842. It is not fusible alone; but with borax it forms a white glass. It is not soluble in water, but it retains that fluid with considerable force. It combines with the acids; its salts having generally a sweetish taste. Several of them, too, are coloured. The sulphate of ittria crystallizes in small brilliant grains, of a rhomboidal form, and of a colour inclining to an amethyst red.

The salts of ittria are decomposed by the three alkalies, and by lime, strontites, and barytes. It is soluble in the alkaline carbonates. Prussiate of potash throws down from the solution a granular precipitate, of a white or pearl-grey colour.

IVA, in botany, a genus of the monœcia pentandria class and order. Natural order of compositæ nucamentaceæ. Corymbiferæ, Jussieu. Male, calyx common, three-leaved; corolla of the disk, one-petalled, five cleft; receptacle with hairs or linear chaffs; female, in the ray, five, or fewer; corolla none; styles two, long; seeds naked, blunt. There are two species.

JUBILEE, a time of public and solemn festivity among the ancient *Hebrews*. This was kept every fiftieth year: and began about the autumnal equinox. At this time all slaves were released, all debts annihilated, and all lands, &c. however alienated, were restored to their first owners. During this whole year all

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JUGLANS
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and order.

-AR, in anatomy, an appellation
wo veins of the neck, which arise
ubclavians

-ARIS, in natural history, an or-
shes according to the Linnæan
They have their ventral fins si-
fore the pectoral fins, and, as it
der the throat. Their body is
covered with scales, and some-
. With a very few exceptions,
spines in the dorsal and anal
heir gills have bony rays. Of
re the following genera; blen-
nimus, gadus, kurtels, trachi-
copus.

eriod, in chronology, a system
7980 years found by multiply-
cycles of the sun, moon, and
o one another. See *Chro-*

natural history, a genus of
order aptera. Lip crenate,
antennæ moniliform; two
m: body long, semi-cylindri-
of numerous transverse seg-
merous, twice as many on
here are segments of the
are 14 species, of which
non is the Julus sabulosus,
nd a quarter long; the co-
black, except the legs,
or whitish; it is an ovi-
and the young when first
all and white, and fur-
three pair of legs, situ-
ead; the remaining pairs
make their appearance
er. This species inhabits
found in damp places

tany, *rush*, a genus of the
ynia class and order.
Tripetaloideæ. Junci,
s-leaved; corolla none;
d. There are twenty-
rushes have a simple
ut leaves or knots, or
sheathing leaf at each
nating or lateral, co-
, with the branchlets
base. The sea-rush-
e sea-banks in Hol-
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, in botany, a genus
gæ class and order
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Britain.

of plants synge-
gregaria class and
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mmon, three-flow-
y; florets tubular,
ligulate; inner
e, chaffy florets
outer lip ligu-
There is one spe-
native of S. Ame-

y, *Juniper-tree*, a
onadelphia class
der of coniferæ.
a scale; corolla
male calyx three-
les three; berry
three seeded, irregular, with the thre
tubercles of the calyx. There are twelv
species; some of these are lofty and
some trees; but the common juniper is
a low shrub, seldom more than three feet
in height. The female flowers are succeeded by roundish berries, at first green, and when ripe of a dark purple colour. They continue on the bush two years, and are sessile in the axil of the leaves. Juniper is common in all the northern parts of Europe. The berries have a strong smell; and a warm pungent sweet taste, followed by a bitterish one.

IVORY, a hard, solid, and firm substance, of a white colour, and capable of a very good polish. It is the tusk of the elephant, and is hollow from the base to a certain height. It is brought to us from the East Indies, and from the coast of Guinea. The Ceylon and Achem ivory, does not become yellow by wear.

To soften ivory and other bones, lay them for twelve hours in aqua fortis, and then three days in the juice of beets, and they will become so soft they may be worked into any form. To harden them again, lay them in strong vinegar.

IVORY *black* is prepared from ivory or bones burnt in a close vessel.

JUPITER, in astronomy, one of the superior planets, remarkable for its great brightness. He removes from west to east in a period of 4332 days. Before he comes into opposition, and when distant from the sun about 150 deg. his motion becomes retrograde and increases in swiftness till he comes into opposition. The motion then becomes gradually slower, and becomes direct when the planet advances within 115 deg. of the sun. The duration of the retrograde motion is about 121 days, and the arch of retrogradation described is about 10 deg. But there is a considerable difference both in the amount and in the duration of this retrograde motion. The figure of Jupiter is an oblate spheroid, the longest diameter of his disk being to the shortest as 13 to 12. His rotation is from east to west, and the plane of his equator is very nearly coincident with that of his orbit; his rotation has been observed to be somewhat quicker in his aphelion than his perihelion. The axis of rotation is nearly perpendicular to the plane of the ecliptic, and the planet makes one revolution in about 9 h. 55 min. and 37 sec.

JURATS, magistrates in the nature of aldermen, for the government of several corporations, &c.

JURY, a certain number of persons sworn to enquire of and *try* some matter of fact, and to declare the truth upon such evidence as shall be laid before them. The jury are sworn judges upon all evidence in any matter of fact. Juries are common or special. The sheriff does not return a separate pannel for every separate cause, but one and the same pannel for every cause to be tried at the same assizes, containing not less than 48, nor more than 72 jurors. Their names being written on tickets are put into a box or glass, and when each cause is called twelve of those persons whose names are first drawn out of the box are sworn upon a jury, unless absent, chal-

[illegible] that is, a sufficient number of persons present in court may be joined to the other jurors, who are however liable to the same challenges as the principal jurors. A jury where either party is alien-born, shall be half denizens and the other aliens (if there are so many in the place).

Special juries were introduced when the causes were of too great nicety for the discussion of ordinary freeholders. To obtain a special jury, a motion is made in court, and a rule is granted thereupon, for the sheriff to attend the master, prothonotary, or other proper officer, with his freeholder's book; and the officer is to take indifferently 48 of the principal freeholders, in the presence of the attornies on both sides, who are each of them to strike off 12, and the remaining 24 are returned upon the pannel.

Jurors are punishable for sending for, or receiving instructions from, either of the parties concerning the matter in question. The jury, after the proofs are summed up, unless the case is very clear, retire to consider, and are kept without meat, drink, fire, or candle, till they have unanimously agreed. If the jury eat or drink, or have any eatables about them, without the consent of the court, before the verdict, they are fineable; and if they do it at the charge of him for whom they find, the verdict will be set aside. Also if they speak with either of the parties, or their agents, after they are gone from the bar, or if they receive any fresh evidence, or cast lots to prevent dispute, the verdict is bad.

In causes of nisi prius, every person whose name shall be drawn, and who [illegible]

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JUSTICES *of the*

JUSTICIA, in
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JUSTICIES, is
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k, the tenth letter of our albet; as a numeral denotes 250 line over it, 250,000.

:RIA, *zedoary*. a genus of the monogynia class and order of atural order of scitamineæ. sien. Corolla six-parted, three larger, spreading, one twotgma two-plated. There are , viz. K. galanga, galangale; ada, natives of the E. Indies. enus of marine plants, which procure alkali.

, in botany, a genus of the mo. ogynia class and order. er of bicornes. Rhododendra, alyx five-parted; corolla salitn the border five-horned beosule five-celled. There are s. The leaves of K. latifolia N. America, are feasted upon and the round horned elk, but r poisonous to sheep horned s, and man. The bee extracts out injury, from its nectary. who partakes of the honey posited in the hive-cells, falls his repast.

, a hot southerly wind, compt. It prevails more or less s. The sky becomes dark and sun loses its splendour, and violet colour, the air is of grey and thick, and is filled so subtile, that it penetrates re. This wind, always light s not at first remarkable h t. ses in heat in proportion as t The lungs which a too rareonger expand, are contracted tes painful. Respiration is fficult, the skin parched and body consumed by an internal ually lasts three days, but if it at time it becomes insupportlanger is most imminent when squalls; for then the rapidity increases the heat to such a o cause sudden death This eal suffocation. The best moding the effects of it is to stop the outh with handkerchiefs The this occasion bury their noses d, and keep them there till is over. Another quality of s its extreme aridity; which t water sprinkled on the floor in a few minutes.

, in the arts, the name of an in the manufacture of orien in. See *Porcelain*.

, or *Keckling*. in the sea line winding of old ropes about revent them from galling.

G, in the sea language, is when ought up or down a narrow ri ns of the tide, the wind being

e lowest piece of timber in a ng her whole length from the of her stem to the lower *part* -post. *Into it are all the lower* futtocks fastened; and under part of it a false keel is often used.

KEELERS, among seamen, are small tubs, which hold stuff for the caulking of ships.

KEELSON, a principal timber in a ship fayed within-side cross all the floor-timbers; and being adjusted to the keel with suitable scarfs, it serves to strengthen the bottom of the ship.

KEEP, in ancient military history, a kind of strong tower, which was built in the centre of a castle or fort, to which the besieged retreated, and made their last efforts of defence.

KEEPER *of the great seal*, is a lord by virtue of his office, and styled the Lord Keeper of the Great Seal of England. He is one of the King's Privy Council, &c. through whose hands pass all charters, commissions, and grants of the King under the great seal; without which, such instruments are of no force.

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KEEPING, in painting, signifies the representation of objects in the same manner that they appear to the eye at different distances from it, which is only to be done with accuracy by attending to the rules of perspective.

KELP, an impure alkali, obtained in the north of Scotland, from different kinds of fuci, or sea weed. The weeds being dried, are burned in pits dug in the sand, or on the surface, surrounded with loose stone, fresh quantities being added, and the whole being frequently stirred until it become a semi-fluid, which, when cold forms hard masses.

KELP, a fixed salt, or particular species of a potash, procured by burning the weed called kali.

KERMES, see *Coccus*.

KERMES *mineral*, in chemistry, a compound of great celebrity, consisting of sulphuretted hydrogen, 20.30, sulphur, 4.16, protoxide of antimony, 72.76; water, and loss, 2.78—100.00.

KETCH, a vessel with two masts, viz. the main and the mizen-mast, and usually from 100 to 250 tons burthen. Ketches are used as bomb-vessels, and are therefore furnished with all the apparatus necessary for a vigorous bombardment.

KETCHES, *bomb*, are built remarkably strong, as being fitted with a greater number of riders than any other vessel of war.

KEY, a well known instrument for opening and shutting the locks of doors, chests, &c. See *Lock*.

KEY, or *key note*, in music, a certain fundamental note or tone, to which the whole of a movement has a certain relation or bearing, to which all its modulations are referred and accommodated, and in which it often begins and ends. There *are but* two species of keys: one of the *major*, and one of the minor mode: all lenged, or excused. When a sufficient number of persons are impannelled, they are separately sworn well and truly to try the issue between the parties, and a true verdict give according to the evidence.

Challenges are of two kinds: to the array, or an exception to the whole pannel; and to the poll, or to a particular juror, on account of his being a peer, alien, infamous, suspected of partiality, not having a sufficient estate, &c. In capital cases the prisoner may challenge 20 persons without assigning any cause. If by reason of challenges, or in default of the jurors, a sufficient number cannot be had of the original pannel, a tales may be awarded both in civil and criminal cases, that is, a sufficient number of persons present in court may be joined to the other jurors, who are however liable to the same challenges as the principal jurors. A jury when either party is alien-born, shall be half denizens, and the other aliens (if there are so many in the place.)

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In causes of nisi prius, every person whose name shall be drawn, and who shall not appear after being openly called three times, shall, on oath made of his having been lawfully summoned, forfeit a sum not exceeding 5l. nor less than 40s. unless some reasonable cause of absence be proved by oath or affidavit, to the satisfaction of the judge. If any juror shall take a bribe of either party, he shall forfeit ten times as much as he has taken, half to the king, and half to him who sues. A man who shall assault or threaten a juror for giving a verdict against him, is highly punishable by fine and imprisonment; and if he strike him in the court, in the presence of the judge, he shall lose his hand and his goods, and the profits of his lands during life; and suffer perpetual imprisonment.

JURY *mast*, whatever is set up in room of a mast that has been lost in a storm or in an engagement, and to which a new yard, ropes, and sails are fixed.

JUSSIÆA, in botany, a genus of the decandria monogynia class and order. Natural order of calycanthemæ. Onagræ, Jussieu. Calyx four or five parted, superior; petals four or five; capsule four or five-celled, oblong, opening at the corners; seeds numerous, minute. There are 11 species, mostly herbaceous plants of S. America, and E. and W. Indies.

JUSTICE, in a legal sense, a person deputed by the king to administer justice to his subjects, whose authority arises from his deputation, and not by right of magistracy.

In the courts of king's bench and common pleas there are two judges called chief justices, each of whom receives the title of lord during the time of his continuing in office. The first of these, who is styled lord chief justice of England, has a very extensive power and jurisdiction in pleas of the crown. He hears and determines in civil causes brought before him in the court of king's bench, and also in pleas of the crown; while the lord chief justice of the common pleas hears and determines of all civil causes between common persons. Besides the lords chief justices, there are in each of the above courts three puisne justices. There are several other justices appointed by the king for the execution of the laws; as the lords justices in eyre of the forests, who are two justices appointed to determine all offences committed in the king's forests; justices of assize, of oyer and terminer, of gaol-delivery, &c. These are also called justices of nisi prius, and are denominated from the words used in the common form of adjournment of a cause in the court of common pleas. See Nisi *Prius*, *Oyer* and *Terminer*, *Common Pleas*, and *King's Bench*.

JUSTICES *of the peace*. See *Peace*.

JUSTICIA, in botany, a genus of the diandria monogynia class and order. Natural order of personatæ. Acanthi, Jussieu. Corolla ringent; capsule two-celled, opening with an elastic claw; stamina with a single anther. There are eighty species, mostly natives of the Indies. Two are cultivated in our gardens, viz. J. adhatoda, Malabar nut, and J. hyssopifolia, snap tree.

JUSTICIES, is a writ directed to the sheriff to do *justice* in a plea of trespass *vi et armis*, or of any sum above 40s. in the county court, of which he hath no cognizance by ordinary power.

IXIA, a genus of the triandria monogynia class and order of plants. Natural order of Ensatæ. Irides, Jussieu. Corolla is one-petalled, tubular; tube straight, filiform; border six-parted, bell-shaped, regular; stigmas three, [illegible]. There are fifty-four species. Almost all the species are natives of the Cape of Good Hope.

IXORA, a genus of the tetrandria monogynia class and order of plants. Natural order of stellatæ. Rubiaceæ, Jussieu. Corolla one-petalled, funnel-form; calyx superior; stamina above the tube; berry four-seeded. There are nine species, very ornamental shrubs.

so plated. There are K. galanga, galangae; natives of the E. Indies. in the plants, which are a kali.

botany, a genus of the nia class and order. cornes Rhododendra. e-parted; corolla sal- border five-horned be- five-celled. There are e leaves of K. latifolia erica, are feasted upon e round horned elk, but ous to sheep horned man. The bee extracts jury from its nectary. partakes of tha honey d in the hive-cells, alls kist.

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KELP, a fixed salt, or particular species of a potash, procured by burning the weed called kali.

KERMES, see *Coccus*.

KERMES *mineral*, in chemistry, a compound of great celebrity, consisting of sulphuretted hydrogen, 20.30, sulphur, 4.15, protoxide of antimony, 72.76; wa-the keys in which we employ sharps or flats being deduced from the natural keys of C major and A minor; of which they are mere transpositions.

KEYS *of an organ*, movable, projecting levers in the front of an organ, so placed as to conveniently receive the fingers of the performer, and which, by a connected movement with the valves or pallets, admit or exclude the wind from the pipes. See *Organ*.

KEY-*stone* of an arch, or vault, that placed at the top or vertex of an arch, to bind the two sweeps together. This, in the Tuscan and Doric orders, is only a plain stone, projecting a little: in the Ionic it is cut and waved somewhat like consoles; and in the Corinthian and Composite orders it is a console, enriched with sculpture.

KIDNAPPING, is the forcibly taking and carrying away a man, woman, or child, from their own country, and sending them to another. This is an offence at common law, and punishable by fine, imprisonment, and pillory. By statute 11 and 12 William III. c. 7, if any captain of a merchant vessel shall, during his being abroad, force any person on shore, and wilfully leave him behind, or refuse to bring home all such men as he carried out, if able and desirous to return, he shall suffer three months imprisonment. Exclusive of the above punishment for this, as a criminal offence, the party may recover upon an action for compensation in damages for the civil injury.

KIDNEYS. See *Anatomy*.

KIESELSCHIEFER, a mineral occurring usually in blocks and amorphous masses of different sizes; very often in the beds of rivers: colour various shades of grey: structure slaty: usually opaque: brittle: specific gravity from 2.860 to 2.415: infusible per se. This species is divided into two subspecies.

KIEFEKIL, a mineral dug up near Konie in Natolia, and is employed in forming the bowls of Turkish tobacco-pipes. It is found in a large fissure six feet wide, in grey calcareous earth. When fresh dug is of the consistence of wax; it feels soft and greasy; its colour is yellow, its specific gravity 1.600: when thrown on the fire it sweats, emits a fetid vapour, becomes hard, and perfectly white. According to the analysis of Klaproth, it is composed of 50.50 silica; 17.25 magnesia; 25,00 water; 5.00 carbonic acid; and .50 lime.

KIGGELARIA, in botany, a genus of the dioecia decandria class and order. Natural order of columniferæ. Euphorbiæ, Jussieu. Male, calyx five-parted; corolla five-petalled; glands five, three-lobed; anthers perforated at the tip; female, calyx and corolla as in the male; styles five; capsule one-celled, five-valved, many seeded. There is but one species, viz. K. africana.

KILDERKIN, a liquid measure, containing two firkins, or eighteen gallons.

KINDRED. See *Inheritance*.

KING. The executive power in Great Britain and Ireland is vested in a single person. Formerly the succession being interrupted, there was occasionally a distinction between a rightful king, or king *de jure*, and a king in possession of the throne, or king *de* [illegible] but it seems now only [illegible] der the rightful power and [illegible] the king, lawfully and [illegible] session of the throne. And [illegible] the crown is by common law [illegible] in a peculiar manner, but [illegible] *vino*; and it may be changed in the [illegible] tation of its descent by the [illegible] the king, lords, and commons in parliament assembled, but it is not [illegible] descends regularly to lineal [illegible] by right of *primogeniture*; but in case of no male heir, it descends to the [illegible] daughter only, and to her issue, [illegible] in coparcenary to all the daughters [illegible] failure of lineal heirs it goes to [illegible] descendants, but there is no [illegible] account of half blood. Lands purchased by the king descend with the crown. The inheritance is not [illegible] ble, but may be altered [illegible] however limited or transferred, it retains its hereditable quality [illegible] wearer of it; and hence the king [illegible] dies, but his right vests *in instant* [illegible] heir. If the throne becomes vacant, either by abdication, as in the case of [illegible] II. or by failure of all heirs, the [illegible] houses of parliament may dispose [illegible] It is now limited to the heirs of the princess Sophia, grand-daughter of James [illegible] being protestant, and married to protestants.

To assist the King in the discharge of his duties and maintenance of his [illegible] and exercise of his prerogative, he has several councils, as the *Parliament*, [illegible] *Peers*, and his *Privy Council*, [illegible] For law matters the judges are [illegible]

The principal duty of the king [illegible] vern his people according to law, [illegible] consideration of the duties incumbent [illegible] him, his dignity and prerogative [illegible] established by the laws of the [illegible] being a maxim in the law, that [illegible] tion and subjection are reciprocal. [illegible] *Prerogative*.

KING *at arms*, or *of arms*, [illegible] who directs the heralds, presides [illegible] chapters, and has the jurisdiction [illegible] ry. There are three kings [illegible] England, viz. *Garter*, *Clarencieux* and *Norroy*, and one for Scotland, viz. *Lyon*.

KING'S *Bench*, is the supreme [illegible] of common law in England; and [illegible] called, because the king [illegible] there in person; it consists of [illegible] justice, and three puisne [illegible] are by their office the sovereign [illegible] vators of the peace, and supreme [illegible] ners of the land. This court has [illegible] culiar jurisdiction, not only [illegible] capital offences, but also over all misdemeanors of a public nature, [illegible] ing either to a breach of the peace, to oppression, or faction, or any [illegible] of misgovernment. It has a [illegible] power of inflicting exemplary [illegible] ment on offenders, either by [illegible] prisonment, or other infamous [illegible] ment, as the nature of the crime, [illegible] sidered in all its circumstances, [illegible] require.

The jurisdiction of this court [illegible] transcendant, that it keeps all [illegible] jurisdictions within the bounds of [illegible]

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KNEE. See *Anatomy*.

KNEE, a crooked piece of timber, having two branches or arms, and generally used to connect the beams of a ship with her sides or timbers.

KNEES, *carling*, in a ship, those timbers which extend from the sides to the hatchway, and bear up the deck on both sides.

KNIGHT, properly signifies a person, who for his virtue and martial prowess, is by the king raised above the rank of gentlemen into a higher class of dignity and honour. The ceremonies at the creation of knights have been various, the principal was a box on the ear, and a stroke with a sword on the shoulder; they put on him a shoulder belt, and a gilt sword, spurs, and other military accoutrements; after which, being armed as a knight, he was led to the church in great pomp. Camden describes the manner of making a knight bachelor among us, which is the lowest, though the most ancient order of knighthood, to be thus: the person kneeling was gently struck on the shoulder by the prince, and accosted in these words, "rise," or "be a knight in the name of God." For the several kinds of knights among us, see *Banneret*, *Baronet*, *Bath*, *Garter*, &c.

KNIGHTS of the shire, or *knights* of parliament in the British polity, are two knights or gentlemen of estate, who are elected on the king's writ, by the freeholders of every county, to represent them in parliament. The qualification of a knight of the shire is to be possessed of 600l. per annum, in a freehold estate.

KNIGHT *service*, a tenure, where lands were held of the king, which drew after it homage and service in war, escuage, ward, marriage, &c. but is taken away by statute 12 Charles II. c. 24.

KNOT, means the division of the log-line used at sea. These are usually seven fathoms, or forty-two feet; they ought to be fifty feet, and then as many knots as the log-line runs out in half a minute, so many miles does the ship sail in an hour, supposing her to keep going at an equal rate.

KNOTS of a rope, among seamen, are distinguished into three kinds, viz whole knot, that made so with the lays of a rope that it cannot slip; bow-link knot, that so firmly made and fastened to the cringles of the sails, that they must break, or the sail split before it slips; and sheep-shank knot, that made by shortening a rope without cutting it.

KNOWLEDGE, is defined by Mr. Locke, to be the perception of the connection and agreement, or disagreement and repugnancy of our ideas.

KNOXIA, in botany, a genus of the tetrandria monogynia class and order. Natural order of stellatæ. Rubiaceæ, Jussieu. Corolla one petalled, funnel-form; seeds two, grooved; calyx one leaflet larger. There is only one species, a native of Ceylon.

KOELREUTERIA, in botany, a genus of the polygamia monoecia class and order. Natural order of trihilatæ. Sapindi Jussieu. Calyx five-leaved; petals four; nectary double, four scalelets and three glands; stamens eight, fixed to a column; germ three sided, fixed to the same column; capsule, three-celled, with two cells in each cell. There is but one species, viz. K. Paullinoides, a tree of China.

KOENIGIA, in botany, a genus of the triandria tryginia class and order. Natural order of holoraceæ. Polygoneæ Jussieu. Calyx, three leaved; corolla none; seed one, ovate, naked. There is one species, viz. K. islandica.

KORAN, or *Alkoran*, the name of the book held equally sacred among the Mahometans as the bible is among Christians.

The general aim of the Koran was, to unite the professors of the three different religions then followed in Arabia, Idolaters, Jews, and Christians, in the knowledge and worship of one God, under the sanction of certain laws, and the outward signs of ceremonies, partly of ancient, and partly of novel institution, enforced by the consideration of rewards and punishments, both temporal and eternal; and to bring all to the obedience of Mahomet, as the prophet and ambassador of God. The chief point therefore inculcated in the Koran is the unity of God, to restore which, the prophet confessed was the chief end of his mission. The rest is taken up in prescribing necessary laws and directions, frequent admonitions to moral and divine virtues, the worship and reverence of the Supreme Being, and resignation to his will.

The style of the Alcoran is generally beautiful and fluent, concise and often obscure, adorned with bold figures; enlightened with florid and sententious expressions; and in many places, especially where the majesty and attributes of God are described, sublime and magnificent. Among Mahometans this book is held in the greatest reverence and esteem. They suppose it to be of divine original, eternal, and uncreated; and that it was revealed to Mahomet by the angel Gabriel, dare not touch it without being first washed, or legally purified; and read it with great care and respect. They [illegible] it, take omens from it on all weighty occasions, carry it with them to war, [illegible] sentences of it on their banners, [illegible] it with gold and precious stones, and not suffer it to be in the possession of any who hold a different religion.

KOS, in Jewish antiquity, a measure of capacity, containing about four c[illegible] inches; this was the cup of blessing, [illegible] of which they drank, when they [illegible] thanks after solemn meals, like that [illegible] the passover.

KRAMERIA, in botany, a genus of the tetrandria monogynia class and order. Calyx none, corolla four-petalled; nectary upper three-parted; lower [illegible] leaved; berry dry, echinated, [illegible] There is but one species, K. [illegible] shrub of South America.

KUHNIA, genus of the [illegible] polygamia æqualis class and order of plants. Natural order of [illegible] discoideæ. Flowers floscular; [illegible] imbricate, oblong, cylindrical; [illegible] plumose; receptacle naked; style [illegible]ly bifid; stigmas club-shaped; [illegible] distinct. There is but one species, viz. K. eupatorioides, a native of [illegible]sylvania.

KUPFERNICKEL, is a mineral of nickel, and is generally compounded of nickel, arsenic, and sulphur [illegible]

KURTUS, in natural history, a genus of fishes of the order Jugulares. [illegible]ric character; body carinated above [illegible] below, and broad; back highly [illegible] gill membrane, with two rays. It [illegible]bits the seas of India. Its length [illegible] ten inches, and its breadth [illegible] colour, on the whole body, a [illegible] silver foil, and its back is tinged with gold, and marked on its ridge with several black spots.

KYANITE, see Cyanite.

KYLLINGIA, in botany, a genus of the triandria monogynia class and order. Natural order of gramina. Cyperoideæ Jussieu. Essential character, [illegible] ovate or oblong, imbricate; [illegible] with a bivalve calyx and corolla. There are seven species, natives of the [illegible] and West Indies.

L.

L, or l, the eleventh letter of our alphabet; a numeral denoting 50; and with a dash over it, 50,000.

LA, in music, the syllable by which Guido denotes the last sound of each hexachord; if it begins in C, it answers to our A; if in G, to E; and if in F, to D.

LABDANUM, or *Ladanum*, is a resin obtained from the surface of the cystus creticus, a shrub which grows in Syria and the Grecian islands. It is collected while moist, by drawing over it a kind of rake, with thongs fixed to it, from which it is afterwards scraped. When it is very good it is black, soft, and has a fragrant odour and a bitterish [illegible] Water dissolves about a [illegible] it, and the matter takes up [illegible] gummy properties. When [illegible] water, a small quantity of [illegible] oil arises. Alcohol may also be impregnated with a taste and smell of labdanum.

LABATIA, in botany, a genus of the tetrandria monogynia class and order. Natural order of [illegible] Calyx four leaved inferior; [illegible] campanulate, four cleft, [illegible]

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; seeds solitary. There
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See *Furnace* and *Che-*

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varies considerably; but it is necessary in all cases, to raise them from the bars of the grate, by a stand. For the purpose of submitting substances to the continued action of a red heat, and with a considerable surface exposed to the air, a hollow arched vessel with a flat bottom, termed a muffle, is commonly used. See *Chemistry*.

3. Evaporating vessels should always be of a flat shape, so as to expose them extensively to the action of heat. They are formed of glass, of earthenware, and of various metals. Evaporating vessels of glass or porcelain, are generally bedded up to their edge in sand; but those of various metals are placed immediately over the naked fire. When the glass or porcelain vessel is very thin, and of small size, it may safely be placed on the ring of a brass stand, and the flame of an Argand's lamp, cautiously regulated, may be applied beneath it. A lamp thus supported, so as to be raised or lowered at pleasure, on an upright pillar, to which rings of various diameters are adapted, will be found extremely useful; and when a strong heat is required, it is adviseable to employ a lamp provided with double concentric wicks.

4. In the process of evaporation, the vapour for the most part is allowed to escape; but in certain chemical processes the collection of the volatile portion is the principal object. This process is termed *Distillation*, which see. The common still, however, can only be employed for volatilizing substances that do not act on copper, or other metals; and is, therefore, limited to very few operations, and on that account alembics and retorts are necessary.

In several instances, the substance raised by distillation, is partly a condensible liquid, and partly a gas, which is not condensed till it is brought into contact with water. To effect this double purpose, a series of receivers, termed Woulfe's apparatus is employed. See *Chemistry*.

When a volatile substance is submitted to distillation, it is necessary to prevent the escape of the vapour through the junctures of the vessels; and this is accomplished by the application of lutes. The most simple method of confining the vapour, it is obvious, would be to connect the places of juncture accurately together by grinding. When the distilled liquid has no corrosive property (such as water, alcohol, ether, &c.) slips of moistened bladder, or of paper or linen spread with flour paste, white of egg, or mucilage of gum arabic, sufficiently answer the purpose. The substance which remains, after expressing the oil from bitter almonds, and which is sold under the name of almond meal or flour, forms a useful lute, when mixed to the consistency of glazier's putty, with water or mucilage.

For confining the vapour of acid or highly corrosive substances, the fat lute is well adapted. It is formed by beating perfectly dry and finely sifted tobacco pipe clay with painter's drying *oil*, to such a consistence that it may be [illegible] which is [illegible] process is [illegible] retort, and that part of the vessel which is exposed to heat, must be carefully coated. To this kind of operation, however, earthen retorts are better adapted; and they may be covered with the following composition. Two ounces of borax are to be dissolved in a pint of boiling water, and a sufficient quantity of slaked lime added to give it the thickness of cream. This is to be applied by a painter's brush, and allowed to dry. Over this a thin paste is afterwards to be applied, formed of slaked lime, and common linseed oil, well mixed and perfectly plastic. In a day or two, the coating will be sufficiently dry to allow the use of the retort. For joining together the parts of iron vessels, a mixture of the finest China clay, with a portion of borax, is well adapted. In these cases, the different parts of any apparatus made of iron should be accurately fitted by boring and grinding, and the above lute is to be applied to the part which is received into an aperture. This will generally be sufficient without any exterior luting.

In every instance, where a lute or coating is employed, it is advisable to allow it to dry before the distillation is begun.

Besides the apparatus already described, a variety of vessels and instruments are necessary, having little resemblance to each other in the purposes to which they are adapted. Glass vessels are required for effecting solution, which often requires the application of heat, and sometimes for a considerable duration. In the latter case it is [illegible] [illegible] the vessel called a mat-

[illegible] these comm [illegible] may be [illegible]

LABORATORY, [illegible] litary affairs, that of fire-works are actual service, and

LABOUR, in gen application to work seamen a ship is said she rolls and tumbl also spoken of a wom

LABOURER, see

LABRADOR stone a grey colour, pass It exhibits, howeve cumstances, a grea as blue, green, yello their different shade spotted and strippe times it held in changes its colour It occurs massive, rolled pieces. Its shining, passing int gravity about 2.7. enamel, with addi pipe. The constitu 68.5; alumina, 1 12; oxide of copp 0.3. It is used for poses.

LABRUS, in natu fishes of the order character, teeth str grinders sometimes lips thick and doub sal fin in severa into soft processe armed and scaly. eight species, L. length of twelve the Mediterranean

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reach. The upper part of its body is covered with a species of armour, so thick and firm, as to be scarcely penetrable by a musket-ball, and the whole body exhibits the appearance of an elaborate covering of carved work. It is an oviparous animal, and its eggs scarcely exceed in size those of a goose. It lies in wait near the banks of rivers, and with a sudden spring seizes any animal that approaches within its reach, swallowing it by an instantaneous effort, and then rushing back into its watery recesses. A single negro will often attack a crocodile, and by spearing it between the scales of the belly, where it is easy penetrable, secure its destruction. The eggs of the crocodile are deposited on the mud or sand of the banks of rivers; and immediately on being hatched, the young move towards the water, in their passage to which, however, vast numbers are intercepted by ichneumons and birds, which watch their progress.

L. *alligator*, the alligator, differs from the former species principally in being more smooth on the upper part of the head, and on the snout being much wider and flatter, and rounder at the end. It grows to the length of eighteen feet, and abounds particularly in the torrid zone, but it is found so far north as the river Neus in North Carolina. It is met with both in the fresh and salt parts of rivers; and amidst the reeds along the banks, lurks in ambush for its prey, seizing upon dogs and cattle which approach within the reach of its fatal bound. Alligators are equally formidable in their appearance, and ferocious in their dispositions, seizing both man and beast with almost indiscriminating voracity, and pulling them to the bottom to lessen their means of resistance, and devour them with less interruption. By the close union of the vertebræ, this animal can proceed with celerity only in a straight forward direction, so that the intended victims pursued by them, are enabled to elude this destination by lateral and cross movements. But though the alligator is deficient in flexibility, it supplies this defect in a great degree by sagacity or cunning, and appearing on the surface of the water, like the stock of a tree, he thus attracts various animals within his grasp. Their eggs are deposited on the banks of rivers, and are hatched by the sun, and the young ones are not only devoured by fishes and birds, but become the victims often of their own voracious species.

L. *guana*, or the great American guana, is found in various parts of America and the West Indies. Its colour is generally green. Its back exhibits the appearance of a saw, and it is distinguished by a pouch under the throat, which it is able to extend or contract at pleasure, and which gives it occasionally an appearance truly formidable. It is, however, perfectly inoffensive. Its general length is from three to five feet; it inhabits rocks and woods, and subsists on vegetable food and certain species of insects. The guanas deposit their eggs (which have no *testaceous* covering, and are much valued by the state of the weather, or the dampness or dryness of their habitation. They may be easily tamed if taken young.

L. *basiliscus*, or the basilisk, is distinguished by a broad wing-like process, elevated along the whole length of its back, somewhat similar to the fins of fishes, and which is capable, at the pleasure of the animal, of being extended or contracted. It lives almost solely in trees, feeding upon insects, and is as harmless as any of the lizard tribe. It is found most frequently in South America, generally about a foot and a half long, swims with great ease, and moves among the branches of the trees with extreme agility, sometimes with a short flight, which is aided by the wing-like process on its back.

L. *monitor*, or the black lizard, measures frequently four and sometimes five feet, being one of the largest as well as the most elegant of the tribe. It is found principally in woody and moist situations in South America, and is reported to give indications of attachment and gratitude to those by whom it has been fed, and familiarised to be as mild in its manners and temper as it is elegant in its form.

L. agilis, or the green lizard, is abundant in all the warmer latitudes of Europe, sometimes attaining the length of more than two feet, but in general not exceeding one. Its colouring is more beautiful than that of any of its tribe in this quarter of the world. It pursues insects with great alertness and dexterity. It may to a certain degree be tamed.

L. *chamæleon*, the chameleon is generally of the length of ten inches without the tail, which is equally long. Its food consists of insects, which it procures by protruding the tip of its tubular and lengthened tongue with inconceivable celerity, and never failing to retract with it the prey at which it was darted. In India and Africa, and various other parts of the world, these animals are found in great abundance. They occasionally retain the

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LACHRYM

a genus of the monan- sia and order of plants. the ament; corolla four- ts bifid; berry pedicelled, here is one species, viz. ound in Surinam and Ja-

pees, is 100,000 rupees; amounts to 12,500l. ster-

are varnishes applied up- nd other metals, to pre- tarnishing, and to im- ur. The basis of lacquers seed-lac in purified and trated spirit of wine. To nt about three ounces of -lac are added; and the d during the same day e heat. The liquor is ined, and cleared by set- r liquor is now fit to re- ed colour from certain re- g substances, the principal mboge and annotto; the h gives a yellow, and the colour. In order to give ur, two parts of gamboge e of annotto; but these ances may be separately the colour required may mixing the two solutions portions.

combinations of earths and ith the lactic acid.

ucle. See *Anatomy*.

T, in botany, a term applied plants of whatever colour, of plants when any injury Most lactescent plants are cepting those with com- which are generally of an y.

d, is contained in milk. of it depends on the change e mucous matter. Scheele cid by the following pro- rated sour whey to one- k, and filtered. He then ter to precipitate the phos- nd diluted the liquid with He next precipitated the y means of the oxalic acid, orated the solution to the honey, poured on a quan- and distilled the clear fil- the whole of the alcohol driven off: what remains id. This acid always ap- m of a viscid mucilaginous a sharp taste; reddens sole and gives a reddish rup of violets. It combines arths, and metallic oxides, them lactates.

ettuce, a genus of the syn- mia æqualis class and or- Natural order of compo- losæ. Cichoraceæ Jussieu. e, cylindrical, with a mem- argin; receptacle naked; th a simple stipitate down. en species; of L. sativa, or n lettuce, there are fifteen

in architecture, an arched more especially the plank- above porticos *and piazzas*.

LADDERS, scaling, in the military art, are used in scaling when a place is to be taken by surprise. They are made several ways; of flat staves, so as to move about their pins and shut like a parallel ruler, of several pieces so as to be joined together, and to be capable of any necessary length; or single ropes knotted at proper distances, with iron hooks at each end, one to fasten them upon the wall above, and the other in the ground; or with two ropes, and staves between them to keep the ropes at a proper distance, and to tread upon.

LADEN; the state of a ship when she is charged with a weight or quantity of materials equal to her tonnage or burthen. If the goods with which she is laden be extremely heavy, her burthen is determined by the weight thereof; but if light, she carries as much as she can stow for the purposes of navigation. As a ton in measure is generally estimated at 2000 pounds in weight, a vessel of 200 tons ought accordingly carry a weight equal to 400,000 pounds; therefore, when the matter of which the cargo is composed is specifically heavier than the water in which she floats; or, in other words, when the cargo is so heavy that she cannot float high enough with so great a quantity of it as her hold will contain, a diminution thereof becomes absolutely necessary.

LADY'S *smock*. See *Cardamine*.

LADY'S SLIPPER. See *Cypripedium*.

LAETIA, a genus of the polyandria monogynia class and order of plants. Natural order of tiliaceæ, Jussieu. Calyx five-leaved; corolla five-petalled, or none; fruit one-celled, three-cornered; seeds with a pulpy aril. There are four species, of which L. guidonia is a tree which grows to a considerable size in Jamaica, and is esteemed highly for its fine timber. A white resin is obtained from it.

LAGERSTRŒMIA, a genus of the icosandria monogynia class and order of plants. Natural order of salicariæ, calyx six-cleft, bell-shaped; petals six, curled; stamina very many, the six outer thicker than the rest, and longer than the petals. There are four species, trees of the East Indies.

LAGŒCIA, a genus of the pentandria monogynia class and order of plants. Natural order of umbellatæ, or umbelliferæ. involucre universal, and partial; petals bifid; seeds solitary, inferior. There is but one species, viz. wild cummin: an annual of the Levant.

LAGUNŒA, in botany, a genus of the monadelphia polyandria, class and order of plants. Natural order of columniferæ. Malvaceæ, Jussieu. Essential character: calyx simple; five-cusped; style simple; stigma peltated; capsule five-celled, five-valved. There are three species, shrubs of the East Indies and Surinam.

LAGURUS, a genus of the triandria digynia class and order of plants. Natural order of gramina; calyx two-valved, with a velose awn; corolla having, on the outer petal, two terminating awns, and a third dorsal one, twisted back. There is one species, a grass of the south of Europe.

LAKE, in the arts, is a combination of *colouring* extract, with an earth or metal-country, but also by the kings of Tartary, who send him rich presents, and go in pilgrimage to pay him adoration. He is called the Great Lama, or Lama of Lamas, that is the priest of priests: and to persuade the people that he is immortal, the inferior priests, when he dies, substitute another in his stead. The priests persuade the people, that the Lama was raised from death many hundred years ago, that he has lived ever since, and will continue to live for ever.

LAMB. See *Ovis*.

LAMINÆ, the thin plates of which any thing consists.

LAMIUM, *archangel*, a genus of the didynamia gymnospermia class and order of plants. Natural order of verticillatæ. Labiatæ, Jussieu. Corolla upper lip entire, vaulted; lower, two lobed; dented with a reflex toothlet on each side. There are thirteen species. The L. album, or dead nettle, is common in hedges, on banks, and by road sides; flowering in April and May.

LAMP, a vessel containing oil, with a lighted wick; of which there is an indefinite number made of various constructions for various purposes.

Argand's Lamp is a very ingenious contrivance. Its superiority depends on the admission of a larger quantity of air to the flame. This is accomplished by making the wick of a circular form, by which means a current of air rushes with great force through the cylinder on which it is placed, and, along with that which has access to the outside, excites the flame to such a degree that the smoke is entirely consumed. Thus both the light and heat are prodigiously increased, at the same time that there is a very considerable saving in the expence of oil, the consumption of the inflammable matter being exceedingly augmented by the quantity of air admitted to the flame; so that what in common lamps is dissipated in smoke is here con-

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phire, and topaz,
el, with diamond
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per wheel with
yacinth, emerald,
tes, and other

the hands of those who touch it. [illegible] ta, black; the edges of the membranaceous covering, and of the feelers scarlet; it inhabits the shores of Barbary, among rocks, and is frequently to be met with off Anglesea.

LAPPAGO, a genus of the triandria digynia class and order of plants. Natural order of gramina. There is one species.

LAPSANA, in botany, a genus of the syngenesia polygamia æqualis class and order. Natural order of compositæ, semiflosculosi. Cichoraceæ, Jussieu. Calyx calycled; each of the inner scales channelled; receptacle naked. There are five species.

LAPSED *legacy*, is where the legatee dies before the testator, or where a legacy is given upon a future contingency, and the legatee dies before the contingency happens.

LARCENY, is the felonious and fraudulent taking away of the personal goods of another, against his will, with intent to steal them. If the goods are above the value of 12*d*, it is called grand larceny; if of that value, or under, it is petit larceny: which two species are distinguished in their punishment, but not otherwise. The mind, or intention, of the act alone makes the taking of another's goods felony or a bare trespass only.

As all felony includes trespass, every indictment must have the words feloniously took, as well as carried away; whence it follows, that if the party be guilty of no trespass in taking the goods, he cannot be guilty of felony in carrying them away. With respect to what shall be considered a sufficient carrying away, to constitute the offence of larceny, it seems that any, chandizes, of the value of 5s. in any shop, warehouse, coach-house, or stable, though it be not broken open, and though no person be therein to be put in fear, and shall prosecute him to conviction, shall have a certificate without fee, under the hand of the judge, certifying such conviction, and within what parish and place the felony was committed, and also that such felon was discovered and taken by the person so discovering or apprehending him. This certificate is commonly called a Tyburn ticket, and exempts the person from all parish and ward offices in the parish where the robbery was committed. See *Burglary*.

LARIX, See *Pinus*.

LARK. See *Alauda*.

LARVA, in natural history. The larva state of insects, in general, denotes caterpillars of all kinds. The caterpillar state is that through which every butterfly must pass before it arrives at its perfection and beauty. The egg of a butterfly produces a butterfly, with all the lineaments of its parent; only these are not disclosed at first, but for the greater part of the animal's life are covered with a sort of case or muscular coat, in which are legs for walking: these only suit it in this state, but its mouth takes in nourishment, which is conveyed to the included animal; and after a proper time this covering is thrown off, and the butterfly, which all the while might be discovered in it by an accurate observer with the help of a microscope appears in its proper form.

Nothing is more surprising in insects than their industry; and in this the caterpillars yield to no kind. Not to mention their silk, the spinning of which is one great proof of it, the sheaths and cases which some of them build for passing their transformations under, are by some made with their own hair, mixed with pieces of bark, leaves, and other parts of trees, with paper, and other materials. There is one

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LARUS, the *gull*,
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candles; of hides, 12 do-
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sued in the King's bench, where the party is to be arrested in any other county than Middlesex.

LATITUDE, the distance of a place from the equator, or an arc of the meridian intercepted between the zenith of the place and the equator. See *Geography*.

Latitude, in astronomy, the distance of a star or planet from the ecliptic. See *Astronomy*.

LATTEN, iron plates tinned over, of which tea-canisters are made. See *Tinning*.

Latten-brass, plates of milled brass, reduced to different thicknesses, according to the uses it is intended for.

LATUS *rectum*, in conic sections, the same with parameter.

Latus transversum, in the hyperbola that part of the transverse diameter, intercepted between the vertices of the two opposite sections.

LAVA, the production of Ætna, Vesuvius, Hecla, and other volcanoes, is of a greyish colour passing to green: it is spotted externally, and occurs porous, carious, or vesicular. Its lustre is vitreous, more or less glistering. It is moderately hard, brittle, easily frangible, and light. It generally attracts strongly the magnetic needle. It is easily fusible into a black, compact glass. It frequently encloses other fossils, especially crystals of felspar, augite, hornblende, and leucite.

LAVANDULA. *Lavender*, a genus of the didynamia gymnospermia class and order of plants. Natural order of verticillatæ. Calyx ovate, obscurely toothed, supported by a bracte; corolla resupine; stamina within the tube. There are seven species, of which L. spica, common lavender, has a shrubby stem much branched.

forward, speaking of things that are stowed in the hold is, put them more forward; launch, ho! is a term used when a yard is hoisted high enough, and signifies hoist no more.

LAURUS, *bay-tree*, a genus of the enneandria monogynia class and order of plants. Natural order of holoraceæ. Calyx none; corolla calycine, six-parted; nectary of three two-bristled glands, surrounding the germ: filaments inner, glanduliferous; drupe one-seeded. There are 32 species. This genus consists of trees or shrubs; leaves mostly entire, in a few nearly opposite, commonly perennial, as in most trees of the torrid zone.

L. nobilis, common sweet bay, grows from twenty to thirty feet in height; it has large evergreen leaves, of a firm texture with an agreeable smell, and an aromatic, bitterish taste; flowers dioecious, or male and female on different trees, in racemes shorter than the leaves, of an herbaceous colour; corollas four-petalled in the male flowers; stamens from eight to twelve; berry superior, of a dark purple colour, almost black: it is a native of the southern parts of Europe and Asia.

L. persea, alligator, or avocado pear of the West Indies, is about thirty feet in height; the fruit is the size of one of our biggest pears, inclosing a large seed with two lobes. It is held in great esteem in the West Indies; the pulp is of a pretty firm consistence, and has a delicate rich flavour.

L. cinnamomum, or cinnamon-tree, is a native of Ceylon. It has a large root, and divides into several branches, covered with a bark, which on the outer side is of a greyish brown, and on the inside has a reddish cast. The body of the tree, which grows to the height of 20 or 30 feet, is covered, as well as its numerous branches, with a bark, which at first is green and afterwards red. The leaf is longer and narrower than the common bay-tree;

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[illegible] by dissolving the metal in nitric acid, and pouring potash into the solution. A yellow-coloured powder is obtained, which is the deutoxide of lead. This oxide is composed of [illegible] parts of lead, and [illegible] of oxygen. When lead is kept melted in an open vessel, its surface is soon covered with a grey-coloured pellicle. When this pellicle is removed, another succeeds it; and by continuing the heat, the whole of the lead may soon be converted into this substance. If these pellicles are heated and agitated for a short time in an open vessel, they assume the form of a greenish grey powder. If we continue to expose this powder to heat for some time longer in an open vessel, it absorbs more oxygen, assumes a yellow colour, and is then known in commerce by the name of massicot.

When thin plates of lead are exposed to the vapour of warm vinegar, they are gradually corroded, and converted into a heavy white powder used as a paint, and called white lead.

3. If massicot ground to a fine powder is put into a furnace and constantly stirred while the flame of the burning coals plays against its surface, it is in about 45 hours converted into a beautiful red powder, known by the name of minium, or red lead.

4. If nitric acid, of the specific gravity 1.260, is poured upon the red-coloured oxide of lead, 185 parts of the oxide are dissolved; but 15 parts remain in the state of a black, or rather deep brown powder. This is the peroxide, or brown oxide of lead,

All the oxides of lead are very easily converted into glass; and in that state they oxidize and combine with almost all the other metals except gold, platinum, and silver. This property renders lead [illegible] with [illegible] gas. [illegible] corrodes it, and [illegible]

[illegible] with most [illegible] it may be [illegible] 2. Platinum and [illegible] the alloy is brittle, of a [illegible] colour, and soon changes on exposure to the air. 3. Silver is [illegible] lead in order to purify [illegible] 4. Mercury amalgamates [illegible] lead in any proportion [illegible] with lead filings, or [illegible] upon melted lead. The [illegible] and when the [illegible] of lead is sufficient, assumes [illegible] form. It is capable of crystallization. [illegible] Copper and lead may be easily combined [illegible] fusion. When the lead exceeds [illegible] a grey colour, and ductile [illegible] but brittle when hot. [illegible] When [illegible] and lead are melted together, [illegible] alloys are formed. [illegible] is found a button of [illegible] containing a little iron; above is the [illegible] with a small portion of [illegible]

[illegible] may be combined in any [illegible] proportion. Its alloy is harder [illegible] much more tenacity than [illegible] a maximum when [illegible] composed of three parts of [illegible] lead. What is called in [illegible] pewter is often scarcely [illegible] Tin foil [illegible] is a compound of tin [illegible] This alloy, in the proportion [illegible] lead and one of tin, is [illegible] than either of the metals separately [illegible] used by plumbers.

[illegible] of lead and of its oxides [illegible]

[illegible] silver, copper, mercury, [illegible] antimony, [illegible] arsenic,

[illegible]

LEAF. See

LEAF-GOLD [illegible]

LEAF. See

LEAF, in cloc lation given to ens.

LEAGUE, a taining more according to the toms of countrie tains three or three Engl league somewha sure, and in so sists of three ces: the mean of two thousan the [illegible] lea teen Spanis sixty-nine and The Dutch an each four geog sian leagues miles, [illegible] the length contained make a mile.

LEAK, [illegible] passage To spring a lea gins to leak. with a pag tarred, or to keep the w of sheet-lead

LEAKAGE, leaks, or lets in or out. Le allowance of allowed to im waste and dam

ids, except leases not
ears, must be made in
ed by the parties them-
agents duly authorised,
ll operate only as lea-
lease is but for half a
, or less time, the lessee
t tenant for years. To
l lease, there must be
ained from making the
t for which it is granted;
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as a lease, to be valid;
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ut sometimes a power is
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d the enabling and dis-
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lease is a conveyance
tat. 27 Hen. VIII. c. 10,
the statute of uses, has
e deed of feoffment, as it
ed of livery and seisin.
a lease or bargain and sale for one year from the tenant to the lessee, is first prepared, whereby the lessee becomes actually possessed of the lands; then by the above mentioned statute the lessee is enabled to take a grant of the lands intended to be conveyed to him and his heirs for ever; accordingly a release is made, reciting the lease, and declaring the uses. In the lease a pepper-corn is a good consideration to make the lessee capable of receiving a release.

LEASES, *value of.* The purchaser of a lease may be considered as the purchaser of an annuity equal to the rack-rent of the estate; and the same principles from which are deduced the present value of annuities to continue during any given term, will apply to the value of leases. The sum paid down for the grant of a lease is so much money paid in advance for the annual rents as they may become due; or, it may be considered as a sum which put out to interest, will enable the lessor to repay himself the rack-rent of the estate, or the yearly value of his interest therein, during the given term. In order to find what this sum should be, it would be necessary to ascertain separately the present value of each annual rent, or the sum which, put out to interest at the given rate, will enable the landlord to repay himself the several yearly rents as they become due. The following Table shews the number of years purchase that ought to be given for a lease, for any number of years not exceeding 100, at 6, 7, and 8 per cent. interest.

Years.	6 per cent.	7 per cent.	8 per cent.
1	.9433	.9345	.9259
2	1.8333	1.8080	1.7832
3	2.6730	2.6243	2.5770
4	3.4651	3.3872	3.3121
5	4.2123	4.1001	3.9927
6	4.9173	4.7665	4.6228
7	5.5823	5.3892	5.2063
8	6.2097	5.9712	5.7466
9	6.8016	6.5152	6.2468
10	7.3600	7.0235	6.7100
11	7.8868	7.4986	7.1389
12	8.3838	7.9425	7.5360
13	8.8526	8.3577	7.9037
14	9.2949	8.7454	8.2442
15	9.7122	9.1079	8.5594
16	10.1058	9.4466	8.8514
17	10.4772	9.7632	9.1216
18	10.8276	10.0590	9.3718
19	11.1581	10.3355	9.6035
20	11.4699	10.5940	9.8181
21	11.7640	10.8355	10.0168
22	12.0415	11.0612	10.2007
23	12.3033	11.2721	10.3710
24	12.5503	11.4693	10.5287
25	12.7833	11.6535	10.6747
26	13.0031	11.3257	10.8099
27	13.2105	11.9867	10.9351
28	13.4061	12.1371	11.0510
29	13.5907	12.2775	11.1584
30	13.7648	12.4090	11.2577
31	13.9290	12.5318	11.3497
32	14.0840	12.6465	11.4349
33	14.2302	12.7537	11.5138
34	14.3681	12.8540	11.5859
35	14.4982	12.9476	11.6545
36	14.6209	13.0352	11.7171
37	14.7367	13.1170	11.775

TABLE (continued.)

Years.	6 per cent.	7 per cent.	8 per cent.
38	14.8460	13.1934	11.8288
39	14.9490	13.2649	11.8785
40	15.0462	13.3317	11.9246
41	15.1380	13.3941	11.9672
42	15.2245	13.4524	12.0066
43	15.3061	13.5069	12.0432
44	15.3831	13.5579	12.0770
45	15.4558	13.6055	12.1084
46	15.5243	13.6500	12.1374
47	15.5890	13.6916	12.1642
48	15.6500	13.7304	12.1891
49	15.7075	13.7067	12.2121
50	15.7618	13.8007	12.2334
51	15.8130	13.8324	12.2532
52	15.8613	13.8621	12.2715
53	15.9069	13.8898	12.2884
54	15.9499	13.9157	12.3041
55	15.9905	13.9399	12.3186
56	16.0288	13.9625	12.3320
57	16.0649	13.9837	12.3444
58	16.0989	14.0034	12.3560
59	16.1311	14.0219	12.3669
60	16.1614	14.0391	12.3765
61	16.1900	14.0553	12.3856
62	16.2170	14.0703	12.3941
63	16.2424	14.0844	12.4020
64	16.2664	14.0976	12.4092
65	16.2891	14.1099	12.4159
66	16.3104	14.1214	12.4222
67	16.3306	14.1321	12.4279
68	16.3496	14.1422	12.4333
69	16.3676	14.1516	12.4382
70	16.3845	14.1603	12.4428
71	16.4005	14.1685	12.4470
72	16.4156	14.1762	12.4509
73	16.4297	14.1834	12.4546
74	16.4431	14.1901	12.4579
75	16.4558	14.1963	12.4610
76	16.4677	14.2022	12.4639
77	16.4790	14.2076	12.4665
78	16.4896	14.2127	12.4691
79	16.4996	14.2175	12.4713
80	16.5091	14.2220	12.4735
81	16.5180	14.2261	12.4754
82	16.5264	14.2300	12.4772
83	16.5343	14.2337	12.4789
84	16.5418	14.2371	12.4805
85	16.5489	14.2402	12.4819
86	16.5556	14.2432	12.4838
87	16.5618	14.2460	12.4845
88	16.5678	14.2486	12.4856
89	16.5734	14.2510	12.4867
90	16.5787	14.2533	12.4877
91	16.5836	14.2554	12.4886
92	16.5883	14.2574	12.4894
93	16.5928	14.2592	12.4902
94	16.5969	14.2610	12.4909
95	16.6009	14.2626	12.4916
96	16.6046	14.2641	12.4922
97	16.6081	14.2655	12.4928
98	16.6114	14.2668	12.4933
99	16.6145	14.2680	12.4938
100	16.6175	14.2692	12.4948

To find the value of a lease, first ascertain the true rack-rent of the estate, or the annual value that it may be justly estimated to be worth; On this point difficulties will sometimes arise; for, the value of an estate depending very often on some real or supposed advantages, or

on some local or personal
tions, will, in many instanc
difference of opinion. Bu
all these circumstances tak
into consideration, some equi
valent thereto must be as
when this is settled, the valu
will be easily found: thus,
worth 150*l*. yearly rent, the val
thereof for sixty-nine years,
purchaser 6 per cent. intere
ney, is 16,3676 (the number
multiplied by 150, or 2,455
the rent of the estate is ch
some annual expence, t
of years purchase found
ble ought to be multiplied b
rence only between such annu
and the whole estimated
estate.

In order to find the yearl
sponding to any given sum pa
divide the sum paid by the
years purchase that are
the given term in the tab
quotient will be the annual
red.

The values in the table ar
on the supposition that the p
the several terms of the esta
yearly; if they are made hal
quarterly, and the purchaser
his money at the same rate,
ceive his interest half-yearly
the values will, in such cas
what more than those given i
The difference, however, is
if the exact value is requir
many cases be obtained by t
the following remarks, viz. th
lue of a lease, the rent of wh
ble half-yearly, is equal to hal
of the same lease payable ye
lated at half the given rate of in
to continue double the numb
and that the value of a lease
which is payable quarterly, is
quarter the value of the same
ble yearly, calculated at a qua
given rate of interest, and fou
times the number of years."

It frequently happens that a
is not to be entered on or enjoy
the expiration of a short lease,
end of a given number of year
cases, deduct the value of the
or the value set against the giv
of years in the table, from th
the longer lease, and the diffe
give the true present value of
lease.

Leases are frequently gran
life, or for a specified term of
ject to termination, if a given li
should fail or become ext
such term; sometimes they dep
longest of two or three lives,
on the failure of one or more
to nominate others on paymen
The values of such may be
found from the tables inserted
article *Life Annuities*.

LEATHER. See *Curri* and T
LEAVEN. See *Fermenta*
LECHEA, a genus of the
gynia class and order. Caly
petals, three-linear; capsule,
ed, three-valved, seeds

nerica and

polyandria
Calyx six-
nectarine,
, circumci-
e six spe-

k wherein
. See *Book-*

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waste-trees
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East Indies

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ficient with-

out it. If the legatee die before the testator, such will in general be termed a lapsed legacy, and fall into the general fund; where, however, from the general import of the will, it can be collected that the testator intended such a vested legacy, it will in such case go to the representative of the deceased legatee. If a bequest be made to a person, if or when he attains a certain age, the legacy will be lapsed, if he die before he attain that age; but if such legacy may be made payable at that age, and the legatee die before that age, such legacy will be vested in his representative. If in the latter case, the testator devise interest to be paid in the mean time, it will nevertheless be a vested legacy. Where a legacy is bequeathed over to another, in case the first legatee die under a certain age, or the like, the legacy will be payable immediately on the death of the first legatee; and though such legacy be not bequeathed over, yet if it carry interest, the representative becomes immediately entitled to it.

In case of a vested legacy due immediately, and charged on land, or money in the funds which yields an immediate profit, interest shall be payable from the death of the testator; but if it be charged on the personal estate only of the testator, which cannot be collected in, it will carry interest only from the end of the year after the death of the testator.

If a bequest be for necessaries, and of small amount, the executor will be justified in advancing a part of the principal; but this should be done under very particular circumspection, as the executor may be compelled to pay the full legacy on the infant's attaining his majority, without deducting the sum previously advanced.

When all the debts and particular legacies are discharged, the residue or surplus must be paid to the residuary legatee, if any be so appointed in the will; but if there be none appointed or intended, it will go to the executor or next of kin. When this residue does not go to the executor, it is to be distributed among the intestate's next of kin, according to the statute of distributions, except the same is otherwise disposable by particular customs. See *Executor*.

LEGATE, a cardinal or bishop, whom the pope sends as his ambassador to sovereign princes.

LEGATUS, in Roman antiquity, a military officer who commanded as deputy of the chief general.

LEGER-LINE, in music, one added to the staff of five lines, when the ascending or descending notes run very high or low.

LEGION, in Roman antiquity, a body of foot which consisted of ten cohorts of 4000, or 4200.

LEGNOTIS, a genus of the class and order polyandria monogynia. Calyx is five-cleft; pet. 5; capsule three-celled. There are two species, trees of Jamaica and Guiana.

LEMMA, in mathematics, a proposition serving to prepare the way for the more easy apprehension of the demonstration of some theorem, or construction of some problem.

LEMON, *salt of*. See *Oxalat of Potass.*

LEMUR, *macauco*, in natural history, a genus of mammalia, of the order primates. Generic character: in the upper jaw four front teeth, the intermediate ones remote; in the lower jaw six, longer, extended forwards, compressed, parallel, and approximated; tusks solitary and approximated; grinders several, and sometimes many, sublobated, the foremost somewhat longer and sharper. This genus of animals is very similar to that of monkeys in the structure of the feet. Some are destitute of a tail, and others have extraordinary long ones. Their manners however are very different from those of monkeys, the following are most remarkable.

L. tardigradus, or the loris. This is of a light brown colour, and of the usual size of a cat. It walks and climbs with great slowness. It sleeps from sun-rise to sun-set without intermission, rolled up in the manner of the hedge-hog; it is extremely attentive to cleanliness, licking its full and rich fur with the same assiduity as a cat. Its food consists of insects, plantains, mangoes, and other fruits.

L. indri, is a native of Madagascar, is the largest of the genus, has a face of a dog-like form, and a fur thick and soft. It has no appearance of a tail: it is very docile, and sometimes trained by the natives to hunt various animals. It is three feet and a half in height.

L. macauco, or the ruffed macauco, is found in some of the Indian islands, and is particularly numerous at Madagascar. It is full of energy and fierceness, and its voice is so strong as to fill the woods with its cries.

L. catta, or the ring-tailed macauco. In their state of nature these animals are seen in companies of twenty or thirty. They feed on almost every species of fruits and, in a state of confinement, like several others of this genus, will take animal food without any hesitation. They are the

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April to Septem
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LEOPARD.
LEOPARD'S
LEPAS, ac
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LEPIDIUM,
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LEPIDOPTE
third *order* of
four wings, co
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[illegible]
There are 11 species, of
[illegible]
a moderate height, [illegible]
the lower part, with a
branches growing close
the top; the younger
grows commonly in dry
mores of New Zealand.
genus of insects of the
. Antennæ setaceous;
rm; shells tapering to-
horax slender, rounded.
150 species, in two di-
lip entire; B. lip bifid.
cies are very beautiful.
black colour, with wing-
y transverse yellow lu-
ning backwards. It is
ds, and generally mea-
e quarters of an inch in
ca, is found on the plants
the water's edge. It is
in length, and of a golden
etimes varying into cop-
e, or blue, and is distin-
g a tooth or process on
legs.
e, a genus of mammalia,
es. Generic character:
ove and below; the up-
two small ones standing
or. These animals ex-
nsiderable differences
order glires in general,
r, upon the whole, they
opriety attached than to
n appearance of rumina-
somewhat connected
There are 15 species,
llowing are chiefly de-

he common hare. This

[illegible] seize and devour it whenever it is within their reach, and eagles, hawks, and other birds of prey are also destructive enemies, but the most formidable of all is man. If taken young it may be tamed and domesticated. It has occasionally been suckled and nursed by a cat. The fur of the hare is of eminent, and almost indispensable utility, in the hat manufactory. This animal was regarded by Moses as unclean, and unfit for food.

L. variabilis, or the varying hare, is an inhabitant of the loftiest territories of the north, both of Europe and America. Its colour in summer is a tawny grey, and in winter it is changed to a perfect white. It never associates with the common hare.

L. cuniculus, or the rabbit, is found in most temperate climates, but not far to the north. It will breed, in favourable circumstances, seven times in a year, and produces about eight young ones at a time. It is most strikingly similar to the hare in general appearance; but while the hare prefers the uncovered field, the rabbit burrows in the ground. It has sharp and long claws for this purpose, and chooses dry and chalky soils, in which it can with the greatest ease construct its mansion. It lives to the age of about eight years.

L. alpinus, or the Alpine hare, is about the size of a Guinea pig, is a native of the Altaic mountains, and burrows in the clefts of the rocks, or resides in the hollows of trees. These animals appear only by night, or in obscure and dull weather. They collect in summer a preparation of herbage, the most delicate and fragrant, and having dried it with the utmost care, set it aside in compact heaps for their subsistence during winter.

[illegible] sounds [illegible] being [illegible] sometimes [illegible] sounds used to express [illegible] particular language.

Letters are distinguished into vowels, consonants, mutes, liquids, diphthongs, and characteristics. They are also divided into labial, dental, guttural, and palatal, and into capital and small letters. They are also denominated from the shape and turn of the letters; and in writing are distinguished into different hands, as round-text, german-text, round-hand, Italian, &c. and in printing into roman, italic, and black letter. See *Alphabet*, *Writing*, and *Print*.

LETTER. The act 5 Geo. III. c. 25, makes it a capital felony, in a servant of the Post-office, to secrete a letter containing any bank note.

LETTER *of credit*, is where a merchant, or correspondent, writes a letter to another, requesting him to credit the bearer with a certain sum of money.

LETTER *of attorney*, an instrument giving to a second person the authority to do any lawful act in the stead of the maker. It is sometimes revocable and sometimes not; in the latter case the word irrevocable is inserted. The authority must be strictly pursued.

LETTER *of licence*, a written permission granted to a person under embarrassment, allowing him to conduct his affairs for a certain time without being molested.

LETTERS *threatening*. To send letters threatening to accuse a person of any crime punished with death or any infamous punishment, and knowingly to send anonymous or fictitious letters threatening to kill any one, or set fire to their tenements or property, with a view of extorting money or valuables from them, is [illegible]

[illegible] cum [illegible] pulse.

L[illegible] [illegible]

LEUCOJ[illegible] of the hexan[illegible] der of plants. N[illegible] cæ. Corolla [illegible] thickened at the There are 4 speci They are natives

LEUCOMA. Se

LEUCOPHRA, a infusoria class an ble to the naked e eight species.

LEUCOPSIS, a g order hymenopter short jaws the ma toothed at the tip membranaceous a lip; four feelers; antennæ short, cl long lanceolate folded; sting ref a groove of the a four species, all for

LEVEL, an instr line parallel to th tinue it out at p means to find the rence of ascent or or more places for ing fens, &c.

Water-Level, sh by means of a su fluid, founded on ter always plac zontally.

The most simple wooden trough o equally filled with the line of level. made with two cu of a straight pipe, a

ly sealed. When
a certain mark,
ddle of the tube
it is fixed is then
hese instruments
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rable distance.
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Level, shews the
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el is the *Spirit*
ite Mr Ramsden.
of finding a lin
at one or more
e height or depth
t to another.

Two or more places are on a true level when they are equally distant from the centre of the earth. Also one place is higher than another, or out of level with it, when it is farther from the centre of the earth; and a line equally distant from that centre in all its points, is called the line of true level. Hence, because the earth is round, that line must be a curve, and make a part of the earth's circumference, or at least parallel to it, or concentrical with it. The common methods of levelling are sufficient for laying pavements of walks, or for conveying water to small distances, &c. but in more extensive operations the difference between the true and the apparent level must be taken into the account. This amounts to about eight inches in every mile, or about four and a half for every hundred yards.

The following table shews the height of the apparent above the true level for every 100 yards of distance on the one hand, and for every mile on the other.

Dist.	Dif. of Level	Dist.	Dif. of Level.	
Yards.	Inches.	Miles.	Feet.	Inc.
100	0.026	1-qr.	0	0 hf.
200	0.103	1-hf.	0	2
300	0.231	3-qr.	0	4 hf.
400	0.411	1	0	8
500	0.643	2	2	8
600	0.925	3	6	0
700	1.260	4	10	7
800	1.645	5	16	7
900	2.081	6	23	11
1000	2.570	7	32	6
1100	3.110	8	42	6
1200	3.701	9	53	9
1300	4.344	10	66	4
1400	5.038	11	80	3
1500	5.784	12	95	7
1600	6.581	13	112	2
1700	7.425	14	130	1

Levels are taken by means of a square painted board, having a broad white stripe horizontally across its centre. This board slides up and down a long pole, which being held perpendicularly by an assistant, at any appointed spot, of which the level is to be ascertained, the instrument is brought to the exact direction in which the pole is situated; so that the latter may coincide, or be in one with that basis which is vertical within the tube. The legs on which the Level is supported, are spread so as to be firm; after bringing the compass as nearly as may be practicable to a level, by means of four screws which serve to raise the different sides of the plate at pleasure, the utmost precision is attainable. The board is then moved up or down on the pole, which is marked all the way up in feet, inches, halves, and quarters, until the centre painted line is in one with the horizontal hair within the telescope. The height of the telescope, above the surface on which it stands, being deducted from the number of feet and inches, at which the line on the board stands above the spot where the pole is fixed, the residue shows how much that is below the place where the instrument stands.

LEVELLING-STAVES, instruments

shrubs of the Cape.

LEY, or *lees*, a term usually applied to any alkaline solution made by levigating any ashes that contain an alkali. Soap-lees is an alkali used by soap boilers, or potash or soda in solution, and made caustic by lime. Lees of wine are the refuse or sediment that deposits from wine by standing quiet.

LEYDEN PHIAL. See *Electricity.*

LEYSERA, a genus of the polygamia superflua order in the syngenesia class of plants. Nat. ord. compositæ; discoid; receptacle naked: pappus paleaceous; that of the disc plumy; calyx scarious. There are three species, shrubs of the Cape.

LIATRIS, a genus of the class and order syngenesia polygamia æqualis. The calyx is oblong, intricate, awnless, coloured down, feathered coloured; receptacle naked, hollow, dotted. There are eight species, herbs of America.

LIBEL, injurious reproaches or accusations written and published against the memory of one who is dead, or the reputation of one who is alive, and thereby exposing him to public hatred, contempt and ridicule.

With regard to libels in general, there are, as in many other cases, two remedies, one by indictment or information, and the other by action. The former for a public offence; for every libel has a tendency to the breach of the peace, by provoking the person libelled to break it; which offence is said to be the same in point of law, whether the matter contained is true or false. But in the remedy by action for damages the defendant may, as for words spoken, justify the truth of the facts, and shew that the plaintiff has received no injury at all. By a late statute, the jury are acknowledged to be judges both of the law and the fact.

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ter plant, and gr
make an effort
back and head i
closed libellula
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the animal's l
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other species,
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face of convex

LIBERTUS, a
son who from b
ed his freedom.

LIBRA, the *ba*
signs of the zodi
Astronomy.

LIBRA, in Ro
weight; also a
twenty denarii.

LIBRATION,
of the moon's m
to librate about
the east to the w
from the west to

LIBRATION
parallelism of th
part of its orbit

LICENCE, in
a person to do
a personal powe
to another.

LICHEN, in bo

that of orchall. L. islandi-
d by the Icelanders in their
y also dry it and make it into
is said to be serviceable to
l consumptions.

, in medicine, a *tetter or ring-*
itaneous disease.

A, a genus of the digynia order,
ndria class of plants. There
petals inlaid in the pit of the
at its base; capsule is bilocu-
earing.

A, a genus of the nat. order
The flowers are all herma-
cal. and cor. three-parted;
form drupe. There is one spe-

NANTS, *Lords, of counties,* offi-
upon invasion or rebellion,
r to raise the militia, and to
nissions to colonels and other

NNUITIES, annual payments,
e during any given life or lives.
certain, that a person of a given
live to the end of a year, the
n annuity of 1*l.* on such a life
the present sum that would in-
year to the value of a life one
, together with the value of the
ment of 1*l.* to be made at the
ar, that is, it would be 1*l.* toge-
he value of a life aged one year
the given life multiplied by
of 1*l.* payable at the end of a
ll the value of a life one year,
the given life N, and the value of 1*l.* payable at the end of a year $\frac{1}{r}$ then will the value of an annuity on the given life, on the supposition of a *certainty*, be $\frac{1}{r}+\frac{1}{r}\times N=\frac{1}{r}\times\overline{1+N}$. But the fact is, that it is *uncertain* whether the given life will exist to the end of the year or not: this last value, therefore, must be diminished in the proportion of this uncertainty; that is, it must be multiplied by the probability that the given life will survive one year, or supposing $\frac{b}{a}$ to express this probability, it will be $\frac{b}{ar}\times\overline{1+N}$. In the same manner the values of annuities on the *joint continuance* of lives may be found: Call the value of any two joint lives M, the probability that two lives one year younger will exist a year $\frac{bd}{ac}$, and $\frac{1}{r}$ as above, the value of 1*l.* payable at the end of the year. Then, by reasoning as before, the value of the joint continuance of two lives one year younger will be expressed by $\frac{bd}{acr}\times\overline{1+M}$."

TABLE I.

ng the Value of an Annuity of 1*l.* on a Single Life, at every Age, accord-
o the Probabilities of the Duration of Human Life at Northampton, reckon-
Interest at 5 per Cent.

.	Value.	Age.	Value.	Age.	Value.
h.	8.863	33	12.740	66	7.034
ar	11 563	34	12.623	67	6.787
	13.420	35	12.502	68	6.536
	14.135	36	12.377	69	6.281
	14.613	37	12.249	70	6.023
	14.827	38	12.116	71	5.764
	15.041	39	12.979	72	5.504
	15.106	40	11.837	73	5.243
	15.226	41	11.695	74	4.990
	15.210	42	11.551	75	4.744
	15.439	43	11.407	76	4.511
	15.043	44	11.258	77	4.277
	14.937	45	11.105	78	4.035
	14.826	46	10.947	79	3.776
	14.710	47	10.784	80	3.515
	14.588	48	10.616	81	3.263
	14.460	49	10.443	82	3.021
	14.334	50	10.269	83	2.797
	14.217	51	10.097	84	2.627
	14.108	52	9.925	85	2.471
	14.007	53	9.748	86	2.328
	13.917	54	9.567	87	2.193
	13.813	55	9.382	88	2.040
	13.746	56	9.193	89	1.924
	13.648	57	8.999	90	1.723
	13.507	58	8.801	91	1.447
	13.473	59	8.599	92	1.153
	13.377	60	8.392	93	0.816
	13.278	61	8.181	94	0.524
	13.177	62	7.966	95	0.238
	13.072	63	7.742	96	0.000
	12.965	64	7.514		
	12.854	65	7.276		

LIFE ANNUITIES

These values suppose the payments to be made *yearly*, and to begin at the [illegible] first year; if the payments are to be made *half yearly*, the value of the [illegible] increased about one-fifth of a year's purchase.

In order to find the present value of an annuity during any given life, [illegible] value in the table corresponding with the age, by the given annuity.

TABLE II.

Shewing the Value of an Annuity during the joint Continuance of [illegible] according to the Probabilities of Life at Northampton, reckoning interest [illegible] Cent.

Ages.	Value.	Ages.	Value.	Ages.	Value.
5—5	11.984	20—25	10.989	40—45	[illegible]
5—10	12.315	20—30	10.717	40—50	[illegible]
5—15	11.954	20—35	10.363	40—55	[illegible]
5—20	11.561	20—40	9.917	40—60	[illegible]
5—25	11.281	20—45	9.448	40—65	[illegible]
5—30	10.959	20—50	8.861	40—70	[illegible]
5—35	10.572	20—55	8.216	40—75	[illegible]
5—40	10.102	20—60	7.473	40—80	[illegible]
5—45	9.571	20—65	6.576	45—45	[illegible]
5—50	8.941	20—70	5.532	45—50	[illegible]
5—55	8.256	20—75	4.435	45—55	[illegible]
5—60	7.466	20—80	3.305	45—60	[illegible]
5—65	6.546	25—25	10.764	45—65	[illegible]
5—70	5.472	25—30	10.459	45—70	[illegible]
5—75	4.367	25—35	10.115	45—75	[illegible]
5—80	3.238	25—40	9.771	45—80	[illegible]
10—10	12.665	25—45	9.304	50—50	[illegible]
10—15	12.502	25—50	8.739	50—55	[illegible]
10—20	11.936	25—55	8.116	50—60	[illegible]
10—25	11.627	25—60	7.373	50—65	[illegible]
10—30	11.304	25—65	6.515	50—70	[illegible]
10—35	10.919	25—70	5.489	50—75	[illegible]
10—40	10.442	25—75	4.306	50—80	[illegible]
10—45	9.900	25—80	3.303	55—55	[illegible]
10—50	9.280	30—30	10.255	55—60	[illegible]
10—55	8.560	30—35	9.954	55—65	[illegible]
10—60	7.750	30—40	9.576	55—70	[illegible]
10—65	6.803	30—45	9.135	55—75	[illegible]
10—70	5.700	30—50	8.596	55—80	[illegible]
10—75	4.522	30—55	7.939	60—60	[illegible]
10—80	3.395	30—60	7.292	60—65	[illegible]
15—15	11.960	30—65	6.447	60—70	[illegible]
15—20	11.585	30—70	5.442	60—75	[illegible]
15—25	11.324	30—75	4.395	60—80	[illegible]
15—30	11.021	30—80	3.190	65—65	[illegible]
15—35	10.655	35—35	9.680	65—70	[illegible]
15—40	10.205	35—40	9.331	65—75	[illegible]
15—45	9.690	35—45	8.921	65—80	[illegible]
15—50	9.076	35—50	8.415	70—70	[illegible]
15—55	8.403	35—55	7.849	70—75	[illegible]
15—60	7.672	35—60	7.174	70—80	[illegible]
15—65	6.705	35—65	6.360	75—75	[illegible]
15—70	5.631	35—70	5.382	75—80	[illegible]
15—75	4.495	35—75	4.327	80—80	[illegible]
15—80	3.378	35—80	3.268	80—85	[illegible]
20—20	11.232	40—40	9.016	90—90	[illegible]

The longest of two lives, may be easily found from the values given in the above tables, by subtracting from the sum of the values of the single lives the value of an annuity on the joint lives; the remainder will give the value of an annuity on the continuance of the longest of two such lives.

The value of an annuity on three joint lives may be found from the preceding tables, by the following rule:

Let A be the youngest, and C the oldest of the three proposed lives; take the value of the two joint lives, B and C, and find the age of a single life D of the same value. Then find the [illegible] joint lives A and D, which will [illegible] answer.

The value of three joint lives being known, the value of the longest of the three lives may be computed by subtracting from the sum of the values of the single lives, the sum of the values of all the joint lives combined two and two, to the remainder add the value of the three joint lives; the last sum will be the value of the longest of the three lives.

LIFE ESTATES are of two kinds, such as are created by the act of the parties, or such as are created by [illegible] by curtesy or

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re eleven species,

LIMAX, the *slug*, or naked snail; a genus of insects belonging to the order of vermes molluscs. Body oblong, fitted for crawling, with a kind of muscular coat on the upper part, and the belly plain. They have four tentacula above the mouth, which they extend or retract at pleasure. This reptile is always destitute of shell. There are eight species, distinguished entirely by their colour; as the black slug, the white slug, the reddish slug, the ash-coloured slug, &c. The black slug is hermaphrodite. A black slug powdered over with snuff, salt, or sugar, falls into convulsions, casts forth all its foam, and dies.

LIME, one of those earthy substances, which exist in every part of the known world. It is found purest in limestone, marble, and chalk. None of these substances are lime, but are capable of becoming so by burning in a white heat. It may be also obtained perfectly pure by burning calcareous spars, and also by burning some pure white marbles. It may be procured also in a state of purity by dissolving oyster-shells in muriatic acid.

Pure lime is of a white colour, moderately hard, but easily reduced to a powder. It has a hot burning taste, and in some measure corrodes and destroys the texture of those animal bodies to which it is applied. Its specific gravity is 2.3. It tinges vegetable blues green, and at last converts them to yellow. If water be poured on newly burnt lime, it swells and falls to pieces, and is soon reduced to a very fine powder. In the mean time so much heat is produced that part of the water flies off in vapour. If a great quantity of lime is slaked, the heat produced is sufficient to set fire to combustibles. In this manner, vessels loaded with lime have sometimes been burnt. When great quantities of lime are slaked in a dark place, not only heat but light also is emitted, as Mr. Pelletier has observed. When slaked lime is weighed, it is found to be heavier than it was before. This additional weight is owing to the combination of part of the water with the lime. The smell perceived during the slaking of lime is owing to a part of that earth being elevated along with the vapour of the water. Limestone and chalk, though they are capable of being converted into lime by burning, possesses hardly any of the properties of that active substance. They are tasteless, scarcely soluble in water, and do not perceptibly act on animal bodies. Lime is not acted on by light, neither does it combine with oxygen. Sulphur and phosphorus are the only simple combustibles with which it unites. It does not combine with alkalies. Its affinities are arranged by Bergman in the following order: oxalic acid, sulphuric, tartaric, succinic, phosphoric, saclactic, nitric, muriatic, suberic, fluoric, arsenic, lactic, citric, benzoic, sulphurous, acetic, boracic, carbonic, prussic.

One of the most important uses of lime is, in the formation of mortar as a cement in building. Mortar is composed of quicklime and sand reduced to a paste *with water*. When dry it becomes as hard as stone, and as durable; and adhering [illegible] recently slaked, and [illegible] to com[illegible] reduced [illegible] being slaked is added, the mortar, when dry, acquires much greater solidity. According to Morveau, the following proportions answer best:

Fine sand, $\frac{3}{10}$ths: Cement of well-baked bricks, $\frac{3}{10}$ths: Slaked lime, $\frac{2}{10}$ ths. Unslaked lime, $\frac{2}{10}$ ths.

The addition of burnt bones improved mortar by giving it tenacity, and rendering it less apt to crack in drying: but they ought never to exceed one-fourth part of the lime employed.

When a little manganese is added to mortar, it acquires the important property of hardening under water.

LIMESTONE. The native indurated carbonate of lime. See *Salts, calcareous.*

LIMESTONE, *primitive and secondary.* See *Rocks.*

LIMEUM, a genus of the class and order heptandria digynia. Cal. five-leaved; pet. five, equal; caps. globular, two celled. There are three species, natives of the Cape.

LIMIT, in a restrained sense, is used by mathematicians for a determinate quantity to which a variable one continually approaches. In algebra, the term is applied to two quantities, one of which is greater, and the other less, than another quantity.

LIMITATION, a certain time prescribed by statute within which an action must be brought. The time of limitation is twofold: first in writs by divers acts of parliament; secondly, to make a title to any inheritance, and that is by the common law.

LIMITS of a planet, its greatest excursion from the ecliptic.

the seed of the linum.
, small pins of iron, which
eel of a cannon or waggon on
.

K, a wooden staff, about three
upon one end of which is a
which divides in two, turning
other, having each a place to
itch, and a screw to keep it
ier end is pointed, and shod
o stick in the ground. It is
ners to fire the guns.
scrapings of linen; used in
ands, and made as tents, dos-
, &c. *Surgery*
Flax; a genus of the penta-
idria order and class of plants.
r, gruinales. Calyx is pen-
petals five, capsule quin-
nd decem ocular; seeds soli-
are 25 species, the most re-
the usitatissimum, or com-
flax, cultivated for the use
acturers
vation of flax. It thrives best
ien, deep loam. Of preced-
tatoes and hemp are the best
for flax. If the ground is free
should be but once ploughed,
hallow as possible, not deep-
and a half inches. It should
reduced to a fine garden
od harrowing, and all stones
uld be carried off. Except a
dung for cold or sour ground,
g should be used preparatory
e brighter in colour, and hea-
is, so much the better; that
bruised appears of a light or
een, and fresh in the heart,
dry, and smells and tastes
not fusty, may be depended
time for sowing is from the
rch to the end of *April*.
to be weeded, when the crop
inches long. When arrived
maturity it must be pulled,
seed-pods having been rip-
d in beets or handfuls and
vater till it feels soft to the
e harle parts easily with the
v, which last is then become
ooks whitish. Then spread
ath or clean old lea ground;
ck or house it.
e *Felis*.
LES, in heraldry, several li-
the same coat of arms.
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s to resemble the upper lip

a genus of the diadelphia,
ss and order of plants. Nat.
lionaceæ. Calyx five-cleft,
d below; stam. the larger,
orter teeth; legume ovate,
e species.
genus of the didynamia
ia class and order of plants,
tellatæ. Cal. four-toothed,
celled two valved, two-seed-
; seed one, two-celled
e species.
Fluids have been divided
and non-elastic. Some do
ly upon each other, separat-
ugh mixed ever so carefully
ompose each *other*.

LIQUIDAMBER, a genus of the monoecia polyandria class and order of plants. Male, cal. common, four-leaved; cor. none; fil. numerous: female, cal. in a globe, four-leaved; corolla none; styles two; caps. many in a globe, two-valved, many-seeded. There are two species, viz. L. styraciflua, or sweet gum; and L. imberbe, oriental liquidamber. The trunk of the former is usually two feet in diameter, straight, and free from branches, to the height of fifteen feet. A sweet glutinous substance exudes through the pores of the leaves in warm weather, in February, before the blossoms break forth from the tops of the branches into spikes of yellowish red papose globular flowers. The wood of this tree is good fine grained timber. From between the wood and the bark issues a fragrant gum, which congeals into transparent drops. The Indians chew it as a preservative to their teeth; it smells very much like Balsam of Tolu. The bark is of singular use to the Indians for covering their huts. Native of N. America.

LIQUOR *of flints*, or silicated alkali. Two or three parts of potash, with one of silica, give a compound, deliquescent in the air, and soluble in water. It is now denominated silicated alkali.

LIQUORICE. See *Glycyrrhiza*.

LIRIODENDRON, a genus of the polygynia polyandria class and order; natural order, coadunatæ. Calyx triphyllous, nine petals; seeds imbricated so as to form a cone. There are two species; the tulipifera is best known here, and is a deciduous tree, native of most parts of America. The flowers are produced with us in July, at the ends of the branches. The number of petals of which each is composed, like those of the tulip, is six; and these are spotted with green, red, white, and yellow.

LISIANTHUS, a genus of the pentandria monogynia class and order. Cal. keeled; cor. with ventricose tube and recurved division; stigma two-plated; caps. two-valved, two celled. There are 9 species, herbs of the West Indies.

LITA, a genus of the class and order pentandria monogynia. Cal. five-cleft; cor. salver-shaped, long tube, five-cleft; caps. one celled, two-valved; seeds numerous. There are two species, herbs of Guiana.

LITHARGE, an oxide of lead.

LITHOPHILA, a genus of the diandria monogynia class and order. Cal. three-leaved; cor. three-petalled; nect. two-leaved. There is one species.

LITHOMARGE, in mineralogy, is a species of the clay genus, and divided by Werner, and others, into two sub-species, viz. the friable and the indurated.

LITHOPHYTA, the name of Linnæus's third order of vermes.

LITHOSPERMUM, *Gromwell*: a genus of the monogynia pentandria order and class of plants; nat. ord. asperifoliæ. Cor. funnel-shaped, with the throat perforated and naked; the calyx quinquepartite. There are 12 species.

LITHOTOMY. See *Surgery*.

LITMUS, in chemistry, a substance, the rent chemical combinations, because they were supposed to resemble the animal liver in colour only. Thus we had liver of sulphur, liver of antimony, &c. &c. See *Sulphuret.*

LIVERY *of seisin*, a delivery of possession of lands, tenements, or other corporeal thing to one that has right.

Livery of seisin must be on the land in the presence of two witnesses, and was anciently used to give publicity to gifts or transfers of land. It is now necessary, in order to complete a feoffment, and to make good a lease for life or grant of the freehold to commence at a future day. Where there is land and a house, it must be made in the house.

LIVERYMEN, of London, a number of men chosen from among the freemen of each company. Out of this body the common council, sheriff, and other superior officers for the government of the city are elected, and they alone have the privilege of giving their votes for members of parliament.

LIVES, or insurance of lives. See *Insurance* and *Life*.

LIXIVIUM. See *Pharmacy.*

LIZARD. See *Lacerta.*

LOAD, or *Lode*, in mining, a word used especially in the tin-mines, for any regular vein or course, whether metallic or not, but most commonly load means a metallic vein.

LOAMS. See *Husbandry.*

LOANS, in political economy, sums of money borrowed from individuals or public bodies, for the service of the state: they are either compulsory, in which case they may be more properly termed requisitions: or voluntary, which is the only mode that can be frequently resorted to with advantage. Loans are sometimes furnished by public companies as a consideration for peculiar privileges: but are much more commonly advanced by indi-

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tent.

LOCHIA. See *Mid*

LOCK, an instru
doors, &c. A great dea
is required in contri
adjusting the ward
&c. and adjusting
where they are to be u
ous occasions of using
rious structure of lock
their different intentio
rious names. Those p
are called stock-locks
doors, spring-locks;
trunk locks, padlocks,
spring-lock is the mos
for its frequency and
structure.

LOCK, or *Wair*, in
a kind of canal incl
gates; the upper cal
and the lower the floo
to confine the water
sage of the boats ea
down the stream.

LOCUS *Geometricu*
local or indetermina
A locus is a line, any
equally solve an
blem. Thus if a righ
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locus ad rectum; if a c
lum, if a parabola.
if an ellipsis, *locus ad*
rest of the conic secti

LOCUST. See *Gry*

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commencement, there
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y; in the second the
the third, the number
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s the fourth, from what
ws; and in the fifth,
weather, variation of

book into which the
-board is transcribed

ee *Hæmatoxylum*.
, something belonging

CURVE. If on the
ways indefinitely ex-
C, CE, EG, GI, IL, on
Ag, gP, &c. on the
e another, and if at the
, G, I, L, be erected
N, the perpendiculars
GH, IK, LM, which
roportional, and repre-
AB, 1; CD, 10; EF 100,
ave two progressions of
and geometrical: for
AG, &c. are in arith-
, or as 1, 2, 3, 4, 5, &c.
e logarithms to which
es AB, CD, EF, &c. do
since AG, is triple of
the number GH shall
e from unity, if CD is
ewise shall LM be in
e AL = 5 AC. If the
roportionals B, *d*, B, D,
y right lines, the figure
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terms in the progres-

CE, EG, &c. are bisect-
e, *g*, *i*, *l*, and there
ne perpendiculars *cd*,
h are mean proportion-
D; CD, EF, &c. then
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s beginning from that
follows unity are dou-
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ns is become less, and
to a ratio of equality,
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AL, A*c*, express the
ms LM, *cd*, from uni-
ten times greater than

A*e*, LM shall be the tenth term of the series from unity; and because A*e* is three times greater than A*c*, *ef* will be the third term of the series if *cd* is the first, and there shall be two mean proportionals between AB and *ef*; and between AB and LM there will be nine mean proportionals. And if the extremities of the lines B*d*, D*f*, F*h*, &c. are joined by right lines there will be a new polygon made, consisting of more but shorter sides than the last.

If, in this manner, mean proportionals are continually placed between every two terms, the number of terms at last will be made so great, as also the number of the sides of the polygon, as to be greater than any given number or to be infinite; and every side of the polygon so lessened, as to become less than any given right line; and consequently the polygon will be changed into a curve-lined figure: for any curve-lined figure may be conceived as a polygon whose sides are infinitely small and infinite in number. A curve described after this manner, is called logarithmical.

It is manifest, that all numbers at equal distances are continually proportional. It is also plain, that if there are four numbers, AB. CD, IK, LM, such that the distance between the first and second, is equal to the distance between the third and fourth, let the distance from the second to the third be what it will, these numbers will be proportional. For because the distances AC, IL are equal, AB shall be to the increment DC, as IK is to the increment MT. Wherefore, by composition, AB : DC :: IK : ML. And contrariwise, if four numbers are proportional, the distance between the first and second shall be equal to the distance between the third and fourth.

The distance between any two numbers, is called the logarithm of the ratio of those numbers; and, indeed, does not measure the ratio itself, but the number of terms in a given series of geometrical proportionals, proceeding from one number to another, and defines the number of equal ratios by the composition whereof the ratios of numbers are known.

LOGARITHMS are numbers so contrived and adapted to other numbers, that the sums and differences of the former shall correspond to, and shew, the products and quotients of the latter.

Or, more generally, logarithms are the numerical exponents of ratios; or a series of numbers in arithmetical progression, answering to another series of numbers in geometrical progression. Thus,

0, 1, 2, 3, 4, 5. Indices, or logarithms.
1, 2, 4, 8, 16, 32, Geometric progression.
Or,
0, 1, 2, 3, 4, 5, Indices, or logarithms.
1, 3, 9, 27, 81, 243, Geometric progression.
Or,
0, 1, 2, 3, 4, 5, Ind. or log.
1, 10, 100, 1000, 10000, 100000, Geo. prog.

Where it is evident that the same indices serve equally for any geometric series; and consequently there may be an endless variety of systems of logarithms to the same common numbers, by only changing the second term, 2, 3, or 10, &c. of the geometrical series.

root.

The logarithms most convenient for practice are such as are adapted to a geometric series, increasing in a tenfold proportion, as in the last of the above forms; and are those which are to be found at present, in most of the common tables upon this subject.

The distinguishing mark of this system of logarithms is, that the index, or logarithm, of 1 is 0; that of 10, 1; that of 100, 2; that of 1000, 3, &c. And in decimals the logarithm of .1 is — 1; that of .01, — 2; that of .001, — 3, &c.

From whence it follows that the logarithm of any number between 1 and 10 must be 0 and some fractional parts; and that of a number between 10 and 100 be 1 and some fractional parts, and so on for any other number whatever.

And since the integral part of a logarithm is always thus readily found, it is usually called the index, or characteristic; and is commonly omitted in the tables; being left to be supplied by the operator himself as occasion requires.

To find the logarithm of any of the natural numbers, 1, 2, 3, 4, *&c. according to the method of Napier*.—1. Take the geometrical series, 1, 10, 100, 1000, 10,000, &c. and apply it to the arithmetical series 1, 2, 3, 4, &c. as logarithms. 2. Find a geometric mean between 1 and 10, 10 and 100, or any other two adjacent terms of the series betwixt which the number proposed lies. 3. Between the mean, thus found, and the nearest extreme, find another geometrical mean, in the same manner; and so on, till you are arrived within the proposed limit of the number whose logarithm is sought. 4. Find as many arithmetical means, in the same order as you found the geometrical ones, and the last of these will be the logarithm, answering to the number required.

$$+ax+\frac{a^2x^2}{2}+\frac{a^3x^3}{2.3}+\frac{a^4x^4}{2.3.4},$$

L) is the hyperbolic loga-
$x)^n$, or N, by what has been
ed; and therefore $1 + L +$
$+\frac{L^4}{2.3.4}$, &c. $=$ N $=$ number

od of using a Table of Loga-

ut of a table the logarithm of
not exceeding 10000, we
mal part by inspection; and
roper characteristic be affix-
ive the complete logarithm

number, whose logarithm is
above 10000, then find the
the two nearest numbers to
found in the table, and say,
ference: the difference of
ms: : the difference of the
er and that whose logarithm
the difference of their loga-
y; and this difference being
subtracted from, the nearest
cording as it is greater or
required one, will give the
uired, nearly.
be required to find the loga-
92.
al part of 3671 is by the table
l of 3672 is .5649027;

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{	367200 is 5.5649027	}	

F. 100 .0001183 diff.
est No. { 367200
n No. { 367182

18 diff.

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)28 — .0000212 = 5.5648815 =
367182, nearly.
ber consists both of integers
, or is entirely fractional, find
part of the logarithm as if all
ere integral; and this, being
he proper characteristic, will
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given number is a proper
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a mixed number, reduce it
er fraction, and find the dif-
logarithms of the numera-
minator, in the same manner

the number answering to any
m, the index, if affirmative,
shew how many integral
quired number consists of,
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gnificant figure, stands; so
garithm can be found in the
nber answering to it will al-
by *inspection.*

But, if the logarithm cannot be exactly found in the table, find the next greater, and the next less, and then say, as the difference of these two logarithms : the difference of the numbers answering to them : : the difference of the given logarithm, and the nearest tabular logarithm : a fourth number; which added to, or subtracted from, the natural number answering to the nearest tabular logarithm, according as that logarithm is less or greater than the given one, will give the number required nearly.

The Use and Application of Logarithms.—Addition of logarithms being the same thing as multiplication in common arithmetic; and subtraction in logarithms the same as division; therefore, in multiplication by logarithms, add the logarithms of the multiplicand and multiplier together, their sum is the logarithm of the product. And in division, subtract the logarithm of the divisor from the logarithm of the dividend, the remainder is the logarithm of the quotient.

To find the Complement of a Logarithm.—Begin at the left hand, and write down what each figure wants of 9, only what the last significant figure wants of 10; so the complement of the logarithm of 456, viz. 2.6589648, is 7.3410352.

In the Rule of Three. Add the logarithms of the second and third terms together, and from the sum subtract the logarithm of the first, the remainder is the logarithm of the fourth. Or, instead of subtracting a logarithm, add its complement, and the result will be the same.

To raise Powers by Logarithms.—Multiply the logarithm of the number given, by the index of the power required, the product will be the logarithm of the power sought.

To extract the Roots of Powers by Logarithms.—Divide the logarithm of the number by the index of the power, the quotient is the logarithm of the root sought.

To find mean Proportionals between any two numbers.—Subtract the logarithm of the least term from the logarithm of the greatest, and divide the remainder by a number more by one than the number of means desired; then add the quotient to the logarithm of the least term (or subtract it from the logarithm of the greatest) continually, and it will give the logarithms of all the mean proportionals required.

LOGIC. The business of logic is to explain the nature of the human mind, and the proper manner of conducting its several powers, in order to the attainment of truth and knowledge.

Logicians therefore, have endeavoured first to define the several faculties and operations of the human mind, as perception, judgment, memory, invention, &c. They next proceed to lay down rules for correct reasoning and argument. Every act of the judgment they term a proposition, and all propositions are either affirmative or negative. All questions or argument they reduce to syllogism, that is, from two axioms or propositions (called terms, laid down, they deduce a third, or conclusion, and the previous propositions they divide into major and minor. Thus, let the question be Whe-

ture of them. Propositions are
affirmative and negative, but they
also particular and universal. He
logisms will vary not only as the
minor proposition is negative or
tive, but as either is an universal
cular affirmative, &c.

The words *mode* and *figure* are
by logical writers to denote the
ment of the terms of a syllogism
done by the use of the letters A, E,
which A denotes universal affirma
universal negative; I, particular a
tive; and O, particular negative.
would be difficult to retain in the m
the various changes in the order o
letters, if prefixed to the three pa
syllogism, fourteen artificial word
been formed, of three syllables eac
taining the vowels so to be prefixed
order of the model to be denoted
word. The 14 modes are classed
these different figures, by which
logicians mean to denote the par
situation of the middle term, with
to the major and minor. The first fi
distinguished by the middle term
the subject of the major, and predi
the minor proposition, and its four
are denoted by the words *Barbara*,
rent, *Darii*, *Ferio*. The second figu
mits of negative conclusions only, th
jor being always universal, and one
premises negative. Its modes are C
Camestres, *Festino*, *Baroco*. And i
third figure the middle term is the
ject of both premises, the minor aff
tive, and the conclusion, particular
moods are *Darapti*, *Felapton*, *Dis*
Datisi, *Bocardo*, *Ferison*.

LOGISTIC *curve*, the same with
otherwise called logarithmic.

LOGISTIC *spiral*. See *Logarithmi*
Spiral.

LOGISTICA *numeralis*, the same
algorithm

ver continue long in bed without sleep-
g. Early rising, even if carried to an
treme, is far more conducive to health
d long life, than late hours at night, and
imbering in bed in the morning.

LONGIMETRY, the art of measuring
ngths.

LONGITUDE *of a star*, in astronomy,
arch of the ecliptic, intercepted be-
een the beginning of Aries and the
int of the ecliptic cut by the star's circle
longitude.

LONGITUDE, in navigation, the dis-
ice of a ship or place, east or west, from
other, reckoned in degrees of the equa-

ince, by the motion of the earth round
axis, every point upon its surface de-
ibes the circumference of a circle, or
deg. in twenty-four hours, it must de-
ibe 15 deg. in one hour. Hence the
ference of longitude may be converted
time, by allowing one hour for every
degrees, and proportionally for mi-
tes; also difference of time may be con-
ted into difference of longitude, by al-
ving 15 deg. for every hour, and pro-
rtionally for a greater or less time.
atever contrivance, therefore, shows
hours of the day, at the same absolute
nt of time, in two different places, like-
se serves to find the difference of lon-
ude. This is effected by time-keepers,
observations of eclipses, of the sun,
on, the satellites of Jupiter, or the ap-
lses of the moon to certain fixed stars,
d their occultations by the interposition
ier body. The invention of Hadley's
adrant, and its modern improvements,
th the degrees of perfection to which
moon's place can now be had, by com-
tations added to the great facilities
orded by the nautical almanack and
les, have rendered the determination
the longitude at sea, a thing of easy
d general practice, by observations
the angular distance of the moon from
ixed star. See *Navigation*, and *Time-*
er.

LONGITUDE *of motion*, the distance
ich the centre of a moving body runs
rough as it moves on in a right line.

LONGITUDINAL, in general, denotes
me thing placed lengthwise.

LONICERA, honey-suckle, a genus of
e pentandria monogynia class and or-
er of plants. Nat. ord. of aggregatæ.
rolla one-petalled, irregular; berry ma-
-seeded, two-celled, inferior. There
e nineteen species, L. grata, or ever-
een honey-suckle, is the most beautiful:
begins to flower in June, and there is a
nstant succession of flowers till the
st puts an end to them.

LOOF, in the sea-language, is a term
ed in various senses. The loof of a ship is
at part which lies just before the chest-
e: keep your loof signifies keep the ship
ar to the wind; to loof into a harbour, is
sail into it close by the wind; loof up, is
keep nearer the wind; to spring the
f, is when a ship that was going large
fore the wind is brought close by the
nd.

LOOKING-*glasses*. See *Optics*.

LOOM, a frame by which several threads
e woven into one piece. See *Weaving*.

LOOM, in the sea-language, when a
ship appears big, when seen at a distance, they say she looms.

LOOM *gale*, a gentle easy gale of wind in which a ship can carry her topsails a-trip.

LOOP, in the iron works, denotes a part of a sow, or block of cast iron, broken or melted off from the rest.

LOOP *holes*, in a ship, are holes made in the coamings of the hatches of a ship, and in their bulk heads, to fire muskets through, in a close fight.

LOPPIUS, the *angler*, a genus of fishes of the order cartilaginei. Gen. char. head depressed, teeth numerous and sharp; mouth armed with teeth; pectoral fins brachiated. There are eight species: L. europæus or the European angler, measures sometimes seven feet in length, but is generally about three, in shape similar to a tadpole. It frequents shallow seas, and imbedding itself almost completely in sand moves its tentacula in various directions. The small fishes mistaking these for worms, catch at them, and are immediately devoured by the angler.

LOPPING, among gardeners, the cutting off the side branches of trees.

LORANTHUS, a genus of the hexandria monogynia class and order. Nat. ord. aggregatæ. Germ. inferior; calyx none; cor. six-cleft, revolute; stamens at the tips of the petals; berry one-seeded. There are eighteen species.

LORD'S *day*. All persons not having a reasonable excuse, shall resort to their parish church or chapel (or some congregation of religious worship allowed by the Toleration Act) on every Sunday, on pain of punishment by the censures of the church, and of forfeiting one shilling to the poor. The hundred are not answerable for robberies on the Lord's day. No person on that day shall serve or execute any writ, process, judgment, &c. (except in cases of treason, felony, or breach of the place) and the service thereof shall be void.

LORICARIA, a genus of fishes of the order abdominales. Gen. char. head smooth; mouth without teeth; gill membrane six rayed; body mailed. There are seven species. The L. costata is found in the seas of India and America, and by the strength and acuteness of its spines is capable of severely wounding.

LOTION, in medicine and pharmacy, is such washing as concerns beautifying the skin, by cleansing it of the deformities made by a preternatural secretion. Almost all the lotions advertised for sale as quack medicines, contain much deleterious matter, such as muriated mercury, and therefore ought never to be had recourse to.

LOTTERIES, games of hazard, in which small sums are adventured for the chance of obtaining a larger value. Lotteries are formed on various plans; but in general they consist of a certain number of tickets, which are drawn at the same time, with a corresponding number of blanks and prizes mixed together, and by which the fate of the tickets is determined. All lotteries, except such as are established by act of parliament, are declared to be public nuisances.

LOTUS, *bird's foot trefoil*, a genus of the

[illegible]

LONGEVITY.—[illegible] beyond its ordinary [illegible] which does not exceed [illegible] instances of persons living to [illegible] upwards. A [illegible] contains the [illegible] of 12 persons who [illegible] tury and upwards, [illegible] ing ages.

[illegible]

Moderate [illegible] the most favourable [illegible] to live long. [illegible]

ıotion of the earth round
›int upon its surface de-
mference of a circle, or
ty-four hours, it must de-
one hour. Hence the
gitude may be converted
›wing one hour for every
d proportionally for mi-
rence of time may be con-
rence of longitude, by al-
for every hour, and pro-
a greater or less time.
ivance, therefore, shows
day, at the same absolute
two different places, like-
ad the difference of lon-
effected by time-keepers,
of eclipses, of the sun,
ites of Jupiter, or the ap-
oon to certain fixed stars,
lations by the interposition
he invention of Hadley's
ts modern improvements,
s of perfection to which
e can now be had, by com-
d to the great facilities
nautical almanack and
dered the determination
de at sea, a thing of easy
ractice, by observations
distance of the moon from
e *Navigation*, and *Time-*

E *of motion*, the distance
e of a moving body runs
ves on in a right line.
N AL, in general, denotes
ed lengthwise.
honey-suckle, a genus of
monogynia class and or-
Nat. ord. of aggregatæ.

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LOTION, in medicine and pharmacy,

stituted by Louis XIV. king of France.

LOUSE, See *Pediculus*.

LOXIA, the *grossbeak*, a genus of birds of the order passeres. Gen. char. bill strong, thick, convex above and below, rounded at the base; nostrils small and round at the base of the bill; tongue truncated. Latham enumerates eighty-four species, and Gmelin a hundred; L. curvirostra, or the cross-bill, is about the size of a lark, and the mandibles of its bill curve in opposite directions, and cross each other at the points. It is found in many countries to the North of Great Britain, and in some years migrates either in considerable flocks. Its favourite food consists of the seeds of pines. In North America it builds on the highest firs, and attaches its nest to the trunk by means of the exuded resin. L. pyrrhula, or the bullfinch, is commonly known in this country, builds in bushes of five or six feet high; changing its residence according to the season; in summer retreating from the habitations of man, in winter preferring orchards and gardens. These birds may be instructed to whistle a variety of tunes and to utter several words. L. chloris, or the greenfinch, is abundant also in this country. They are easily familiarised, and imitate the notes of other birds with great success.

LOZENGE, *lozange*, *rhombus*, in geometry, a quadrilateral figure, consisting of four equal and parallel sides, two of whose opposite angles are acute, and the other two obtuse; the distance between the two obtuse ones being always equal to the length of one side.

LOZENGE, in heraldry, a rhombus, or figure of equal sides, but unequal angles.

LOZENGE, in pharmacy, the same with what is otherwise called troche.

LUCANUS, a genus of insects of the order coleoptera. Antennæ clavate, the club compressed and dividing into pectinate

sisting of 29 d. 12 h. 44 min.
xceeding the periodical by
3sec.

athematics, is a geometrical
of a crescent, terminated by
o circles that intersect each

in fortification, an enve-
guard, or mound of earth
he second ditch opposite to
ms.

part of the body which is
of respiration.

upine, a genus of the diadel-
s class and order of plants.
lionaceæ. Cal. two lipped;
long, five roundish; legume
here are ten species, chief-
s, annuals.

see *Hops*.

Canis.

rnithology, the monedula, or

inus, is a very singular
o four or five feet long. See

southern constellation, of
rs.

botany, the name of the
order in Linnæus's "frag-
ural method," consisting of
ppearance seems to indi-
g noxious: deadly night-
pepper, fox-glove, tobacco,
order.

en a ship heels more one
her, she is said to have a

mineralogy. The bright-
ternal surface of a mineral,
rnal when newly broken.
1. *Splendent*, when in full
n be seen at a great dis-
ning, when at a distance
ght is weak: 3. *Glistening*,
re is observable only at an
4. *Glimmering*, when the
near the eye in full day
a number of shining points.
the surface has no lustre.
kinds of lustre, the metal-
on. The latter is subdivid-
us, silky, waxy or greasy,
l, diamond and semi-me-

cal instrument with strings;
s of four parts, viz. the table;
h has nine or ten sides; the
is nine or ten stops or divi-
with strings; and the cross,
w for raising and lowering
proper pitch are fixed. In
he table there is a passage
and a bridge to which the
ned. In playing, the strings
h the right hand, and with
s are pressed.

many chemical operations
st be covered with some-
ve them from the violence
n being broken or melted;
se exactly their joinings to
order to retain the substan-
y contain, when they are
educed to vapour.

used for retorts, &c. to de-
the action of the fire, is
sed of nearly equal *parts of* coarse sand, and refractory clay. These matters ought to be well mixed with water and a little hair, so as to form a liquid paste, with which the vessels are covered, layer upon layer, till it is of the required thickness. The sand mixed with the clay is necessary to prevent the cracks which are occasioned by the contracting of the clay during its drying, which it always does when pure. The hair serves also to bind the parts of the lute, and to keep it applied to the vessel; for, notwithstanding the sand which is introduced into it, some cracks are always formed, which would occasion pieces of it to fall off.

The lutes with which the joinings of vessels are closed, are of different kinds, according to the nature of the intended operations and of the substances to be distilled in these vessels.

When vapours of watery liquors, and such as are not corrosive, are to be contained, it is sufficient to surround the joining of the receiver, to the nose of the alembic, or of the retort, with slips of paper or linen, covered with flour paste. In such cases also, slips of wet bladder are very conveniently used.

When more penetrating and dissolving vapours are to be contained, a lute is to be employed of quick-lime, slaked in the air, and beaten into a liquid paste with whites of eggs. This paste is to be spread upon linen slips, which are to be applied exactly to the joining of the vessel. This lute is very convenient, easily dries, becomes solid, and sufficiently firm.

Lastly, when saline, acid, and corrosive vapours are to be contained, we must then have recourse to the lute called fat-lute. This lute is made by forming into a paste some dried clay, finely powdered, sifted through a silken searce, and moistened with water; and then by beating this paste in a mortar with boiled linseed-oil, or oil which has been rendered dry by litharge dissolved in it, this lute easily takes and retains the form given to it. It is generally rolled into cylinders of a convenient size. These are to be applied, by flattening them, to the joinings of the vessels, which ought to be perfectly dry; because the least moisture would prevent the lute from adhering. When the joinings are closed with this fat-lute, the whole is to be covered with slips of linen spread with a lute of lime and whites of eggs. These slips are to be fastened with packthread. The second lute is necessary to keep on the fat-lute, because the latter remains soft, and does not become solid enough to stick on alone.

Ground linseed made into a paste with water makes also a very useful lute for most occasions.

LUTHERANS, Christians who follow the opinions of Martin Luther.

LUXATION, when a bone is moved out of its place, or articulation, so as to impede or destroy its proper motion.

LYCHNIS, campion, a genus of the decandria pentagynia class and order of plants. Nat. ord. Caryophyllei. Calyx one-leafed, oblong, even; petals five, with claws, and a sub-bifid border; capsule five-celled. There are twelve species.

LYCIUM, *box-thorn*, a genus of the

pentandria monogynia class and order of plants. Nat. ord. Luridæ. Corolla tubular, closed at the throat by the beard of the filaments; berry two-celled, many-seeded. There are thirteen species.

LYCOPERDON, in botany, a genus of the cryptogamia fungi class and order. Nat. ord. of mushrooms. Fungus roundish, fleshy, firm, becoming powdery, and opening at the top; seeds fixed to filaments connected with the inner coat of the plant. There are twenty-five species.

LYCOPODIUM, *club-moss*, a genus of the cryptogamia miscellaneæ class and order of plants. Nat. ord. mosses. Fructifications in the axils of the scales digested into oblong imbricate spikes, or the leaves themselves, sessile; capsule kidney-shaped, two-valved, elastic, many-seeded; veil none. There are twenty-nine species.

LYCOPSIS, a genus of the pentandria monogynia class and order of plants. Nat. ord. asperifoliæ. Corolla with the tube bent in. There are eight species.

LYCOPUS, a genus of the diandria monogynia class and order of plants. Nat. ord. of verticillatæ. Cor. four-cleft; with one division emarginate; stamina distant; seeds four, retuse. There are three species.

LYDIAN *stone*, is of a black or greyish black colour; it occurs massive, and is likewise found in trapezoidal-shaped rolled pieces with rounded angles. When polished, it is used as a test-stone for determining the purity of gold and silver.

LYGEUM, a genus of the triandria monogynia class and order of plants. Nat. ord. Grasses. Spathe one-leafed; corolla two on the same germ; not two-celled. There is only one species, viz. L. spartum, a native of Spain.

LYING *to*, the situation of a ship when she is retarded in her course, by arranging the sails in such a manner as to counteract each other with nearly equal effect, and render the ship almost stationary with respect to her headway; a ship is usually brought to by laying either her main top-sail aback, the helm being put close down to leeward.

LYMPH, a fine fluid, separated in the body from the mass of blood, and contained in peculiar vessels. It is distinguished into watery and coagulable.

LYRE, a musical instrument of the string kind, much used by the ancients.

LYRE, in astronomy, a constellation of the northern hemisphere.

LYRIC. See *Poetry*.

LYSIMACHIA, *loosestrife*, a genus of the pentandria monogynia class and order of plants. Nat. ord. of rotaceæ. Cor. wheel-shaped; capsule globular, mucronate, ten-valved. There are twelve species.

LYTHRUM, *willow-herb*, a genus of the dodecandria monogynia class and order of plants. Nat. ord. of calycanthemæ. Salicariæ, Jussieu. Calyx twelve-cleft; petals six, inserted into the calyx; capsule two-celled, many-seeded. There are eighteen species.

LYTTA, in natural history, a genus of insects of the order coleoptera. Antennæ filiform; four feelers, unequal, the hind ones clavate; thorax roundish, head inflected, gibbous; shells soft, flexile, as long as the abdomen. There are upwards of thirty species.

M

M, the twelfth letter of our alphabet: As a numeral, M stands for a thousand; and with a dash over it, thus, M̄, 1,000,000. M. A. magister artium; M. *D.* medicinæ doctor; MS. manuscript; and MSS. manuscripts, in the plural. In the prescription of physicians, M. stands for manipulus, a handful; and sometimes for misce, or mixtura: in astronomy, &c. M is used for meridian.

MABA, a genus of the diœcia triandria class and order of plants. Calyx trifid; male, corolla trifid; female, drupe superior, two-celled. There is one species, a tree of the Friendly Islands.

MABEA, a genus of the monœcia polyandria class and order. Nat. ord. tricoccæ: calyx one-leafed, five-toothed; corolla none: There are two species, viz. M. piriri, and M. tarquari, both shrubs, called pipe-wood. The Negroes use the smaller branches for pipes.

MACAO, or *Macaw*. See *Psittacus*.

MACARONIC, an appellation given to a burlesque kind of poetry, made up of a jumble of words of different languages, and words of the vulgar tongue latinized.

MACE, the second coat of the kernel of the nutmeg, is a thin and membranaceous substance, of an oleaginous nature, and a yellowish colour; being met with in flakes of an inch and more in length, which are divided into a multitude of ramifications. It is of an extremely fragrant, aromatic, and agreeable flavour. See *Myristica*.

MACERATION, in pharmacy, an infusion of, or soaking ingredients in water or other fluid, in order to soften them and draw out their virtues.

MACHINE. See *Mechanics*.

MACHINERY, in epic and dramatic poetry, is when the poet introduces the use of machines, or brings some supernatural being upon the stage, in order to solve some difficulty, or to perform some exploit out of the reach of human power.

MACKREL. See *Scomber*.

MACROCEPHALUS, a genus of insects of the order hemiptera: snout inflected, the sheath one valved, three jointed, and with three bristles; antennæ projecting, very short, submoniliform, clavate; body oblong, cylindrical above; shells as long as the abdomen, depressed, [illegible]

is only one species, viz. M.
und in N. America; the
ginous grey; scutel pale
ellow rigid spot; under-
violet; fore-shanks thick-

MOM, a genus of the pen-
ynia class and order of
ord. contortæ. Cor. bell-
two-celled, two-valved,
. There are 3 species.
IUM, a genus of the tri-
nia class and order. Nat.
eæ. Cal. double; petals
dicelled, legume. There

, the *kanguroo*, a genus of
he order feræ. Gen cha.
in the upper jaw, emargi-
the lower, and very long,
nd pointing forwards, five
h side of the upper and
tant from the other teeth;
hort; hind ones very long;
ith an abdominal pouch.
is one of the most curious
ls discovered on the conti-
South Wales. When full
about 150 pounds; its co-
rown; its length from the
is between four and five
ength of the tail is about
s general position, when
of standing on its hind feet,
extent to the knees, and its
frequently employed, like
quirrel, as hands. Vegeta-
icularly grass, constitute its
ent. In its rapid motions,
are wholly useless, and it
aping on its hind-feet, which
the distance of fourteen
with bounds so rapid in
at it exceeds in swiftness a
Kanguroos possess the fa-
rating at pleasure the two
n their lower jaw; and the
ished with a pouch in the
traordinary depth, in which
teats. But one young one
a time, which when first ob-
pouch, after its birth, is
than an inch in length, but
iderable size in its natural
re it quits it, and frequently
warmth and security after
ment from it.
genus of the vermes tes-

and broad plank of wood, used for supporting the earth in mining, &c. Madriers are also used to cover the mouths of petards, after they are loaded, and are fixed with the petards to the gates of other places designed to be forced open.

MADRIGAL, in the Italian, Spanish, and French poetry, is a short amorous poem, composed of a number of free and unequal verses, neither confined to the regularity of a sonnet, nor to the point of an epigram; but only consisting of some tender and delicate thought, expressed with a beautiful, noble, and elegant simplicity.

MÆMACTERION, the fourth month of the Athenian year, consisting of only 29 days, and answering to the latter part of September and the beginning of October.

MAGAZINE, a place in which stores are kept, of arms, ammunition, provisions, &c.

MAGAZINE, *powder*, a place in which powder is kept in large quantities, and which should be arched and bomb-proof.

MAGGOT. See *Musca*.

MAGI, or *Magians*, an ancient religious sect in Persia, and other eastern countries, who maintained, that there were two principles, the one the cause of all good, the other the cause of all evil; and abominating the adoration of images, worshipped God only by fire, which they looked upon as the brightest and most glorious symbol of Oromasdes, or the good God; as darkness is the truest symbol of Arimanius, or the evil God. This religion was reformed by Zoroaster. The sect still subsists in Persia, under the denomination of *gaurs*.

MAGIC *lantern*. See *Optics*.

MAGIC *square*, in arithmetic, a square figure made up of numbers in arithmetical proportion, so disposed in parallel and equal ranks, that the sums of each row, taken either perpendicularly, horizontally, or diagonally, are equal.

MAGISTERY, an old chemical term, very nearly synonymous with precipitate.

MAGNA CHARTA, the great charter of the liberties of England, and the basis of our laws and privileges.

MAGNESIA, in chemistry, an earth which exists in great abundance in combination with other substances, but has never been found perfectly pure in na-

[illegible] polarity of the magnet; the end of the magnet are called poles; and the are called north and south poles of the magnet, according as they point to the north o south pole of the earth. When a magne places itself in this direction, it is said t traverse. 3 When the north pole of one magnet is presented to the south of another magnet, these ends attract each other: but if the south pole of one magnet is presented to the south pole of another, or the north pole of one to the north pole of another, these ends will repel each other. 4. When a magnet is situated so as to be at liberty to move itself with sufficient freedom, its two poles do not lie in a horizontal direction, but it generally inclines one of them towards the horizon, and of course it elevates the other pole above it. This is called the inclination or dipping of the magnet. 5. Any magnet may, by proper methods, be made to impart those properties to iron or steel. A plane perpendicular to the horizon, and passing through the poles of a magnet when standing in their natural direction, is called the magnetic meridian; and the angle which the magnetic meridian makes with the meridian of the plane where the magnet stands, is called the declination of the magnet at that place.

When a piece of iron is brought within a certain distance of one of the poles of a magnet, it is attracted by it; and if the iron is at liberty to move, it adheres to the magnet, and cannot be separated without some force. This attraction is mutual, is strongest at the poles of a magnet, and diminishes in proportion to the distance of any part from the poles, so that in the middle between the poles there is no attraction. The intensity of the attractive power diminishes also, according to the distance from the magnet. Magnetic attraction takes place only between poles of different names of different r the appearance of the aurora be- ls.

f a needle which is accurately balanced l suspended so as to turn freely in a tical plane, is rendered magnetical, north pole will be depressed, and the th pole elevated above the horizon: property is called the inclination, or of the needle.

here are various methods of giving the gnetic property to steel or iron.

f you take a bar of soft iron three or r feet long, and hold it in a vertical ition, you will find that the bar is magic, and will act upon another magnet; lower extremity of the bar attracting south pole, and repelling the north e. If you invert the bar, the polarity l be instantly reversed. the extremity ich is now lowest will be found to be a th pole, and the other extremity will a south pole. Bars of iron that have od in a perpendicular position, are erally found to be magnetical; as -irons, bars of windows, &c. If a long ce of hard iron is made red hot, and is left to cool in the direction, of the gnetical line, it becomes magnetical. ing an iron bar with a hammer, or bing it with a file, while held in this ection, likewise renders it magnetical. electric shock produces the same ef-; and lightning often renders iron magic. A magnet cannot communicate a ee of magnetism stronger than that ich itself possesses; but two or more gnets, joined together, may communie a greater power to a piece of steel, n either of them possesses singly.

o communicate the magnetic power a needle, let it be placed horizontally, with a magnet in each hand, let the th pole of one, and the south pole of other be brought, obliquely, in cont over the centre of the needle; draw m asunder, taking care to press firmand preserving the same angle or iniation to the very ends of the needles, ich should be supported by two mag-, whose ends ought to correspond in arity with those of the needle. Observe arry the magnets you press with clear ay from the ends of the needle, at st a foot therefrom; repeat the fric- in the same manner several times, haps six, eight, or ten times, and the dle will be permanently magnetized. using other magnets in succession, the vers of the needle will be proportion- increased. But no effect will result n the friction if the bars are rusty, or eed not highly polished; their angles st be perfect, and their several sides ends flat. See *Mariner's Compass.*

AGNETISM, *animal*, a pretended de of curing all kinds of disease by ans of a sympathetic affection between sick person and the operator.

AGNIFYING, in philosophy, the king of objects appear larger than they ald otherwise do; whence convex len- which have the power of doing this, called magnifying glasses.

AGNITUDE, whatever is made up of is locally extended, or that hath seve- dimensions; as a line, surface, solid. apparent magnitude of a body is that measured by the visual angle, formed by rays drawn from its extremes to the centre of the eye. Geometrical magnitudes may be usefully considered as generated or produced by motion. Thus, lines may be conceived as generated by the motion of points; surfaces, by the motion of lines; solids, by the motion of surfaces; angles may be supposed to be generated by the rotation of their sides.

MAGNOLIA, a genus of the polyandria polygynia class and order. Nat. order coadunatæ. Calyx three-leaved; petals nine: capsule one-celled, two-valved; seeds berried, pendulous. There are seven species; of which M. grandiflora, great laurel-leaved magnolia, or tulip tree, in the southern provinces of North America, grows to the height of eightyfeet.

MAHERNIA, a genus of the pentandria pentagynia class and order. Nat. order of columniferæ. Tiliaceæ, Jussieu. Essential character: calyx five-toothed; petals five; nectaries five, obscordate, placed under the filaments; capsule five-celled. There are three species, natives of the Cape of Good Hope.

MAHOGANY. The swietenia mahagoni, or mahogany tree, is a native of the warmest parts of America, and grows also in the island of Cuba, Jamaica, Hispaniola, and the Bahama islands. This tree grows tall and straight, rising often sixty feet from the spur to the limbs; and is about four feet in diameter. The foliage is a beautiful deep green, and the appearance made by the whole tree very elegant. The flowers are of a reddish or saffron colour, and the fruit of an oval form, about the size of a turkey's egg. Some of them have reached to a size, exceeding one hundred feet in height. The mahogany tree thrives in most soils, but varies in texture and grain, according to the nature of the soil. On rocks it is of a smaller size; but very hard and weighty, and of a close grain, and beautifully shaded; while the produce of the low and richer lands is more light and porous, of a paler colour, and open grain; and that of mixed soils holds a medium between both. This wood is generally hard, takes a fine polish, and is found to answer better than any other sort in all kinds of cabinet ware.

MAHOMETANS, believers in the doctrines and divine mission of Mahomet, the celebrated warrior and pseudo-prophet of Arabia. In the Mahometan religion we find a prodigious number of rites, ceremonies, and observations: the principal of which are: circumcision, ablutions, fastings, pilgrimage, polygamy, marriage rites, mourning for the dead, funeral rites, and the observance of Friday as a sabbath. See *Koran.*

MAIDEN, in ancient English customs, an instrument for beheading criminals. It was in form of a painter's easel, about ten feet high: at four feet from the bottom was a cross bar, on which the felon laid his head, which was kept down by another placed above. In the inner edges of the frame were grooves; in these were placed a sharp axe, with a vast weight of lead, supported at the very summit with a peg: to that peg was fastened a cord, [illegible] cut [illegible] or shall [illegible] with intent to murder, [illegible] any woman [illegible] he shall be guilty of felony, [illegible] A person who [illegible] more [illegible] be fined and [illegible].

MAINPRIZE, [illegible] delivering a person to [illegible] to be answerable for his appearance.

MAINTENANCE, the unlawful taking in hand, or upholding the cause of any person. It is [illegible] formerly [illegible] also to assist any person in law [illegible], except as an attorney, advocate, [illegible], servant, or near relation [illegible].

MAJOR, in the art of war, the name of several officers; as, 1. Major general, the next officer to the lieutenant-general: [illegible] to receive the orders from the general, or in his absence from [illegible] of the day; which he [illegible] to the brigade-majors, [illegible] regulate the guards, [illegible]. When there [illegible] siege, he commands [illegible]. 2. Major of a brigade, [illegible] receives the orders from the [illegible] and afterwards delivers them to the [illegible] of the regiments [illegible] of the brigade, where [illegible] the detachments, &c. [illegible] 3. Major of a regiment, [illegible] next to the lieutenant-colonel, [illegible] promoted from the [illegible]. His [illegible] to take care that the [illegible] to see it [illegible], and to rally it in case it be broken. 4. Major of a re-

[illegible] the [illegible] &c. 4.

MALATES, in che[illegible] by the union of the [illegible] ferent bases.

The malates of pot[illegible] lime, and barytes, m[illegible] solving these alkalie[illegible] evaporating the solut[illegible]

MALAXIS, in b[illegible] gynandria and in the [illegible] order of orchideæ. [illegible] concave cordate, a[illegible] bifid interior. These [illegible] tives of Jamaica.

MALE, among zo[illegible] animal which has th[illegible] without the body. [illegible] also been applied t[illegible] things: thus we say [illegible] male-screw, &c.

MALIC *acid*, is fo[illegible] great many fruits, an[illegible] from its being obta[illegible] dance from apples. [illegible] saturate the juice of [illegible] and add to the solutio[illegible] no more precipitate [illegible] precipitate is carefully [illegible] on it a diluted [illegible] ture has a perfectly [illegible] the sulphate of lead by [illegible] remains behind pure [illegible] acid is very soluble in [illegible] poses spontaneously, [illegible] tation. It is compose[illegible] gen, and carbon.

MALLEABLE, a [illegible] whereby they are ca[illegible] ed under the hamme[illegible]

MALLET, a wo[illegible]

he outside at the base ;
idish, with claws ; berry
-seeded. There are 18
ich M. glab[illegible] smooth-
cherry, usually grows to
r 18 feet, and produces a
of the size of a cherry, and
ible flavour.

applied to grain which
to germinate artificially
it, after which the pro-
y the application of heat.
eped in cold water for a
an forty hours. When it
eped, the water is drain-
barley thrown upon the
it is formed into a rect-
steen inches deep. In
nains about twenty-six
en turned by means of
and diminished a little in
ation is repeated twice or
the grain is spread thin-
till at last its depth does
inches. On the couch it
from the atmosphere,
into carbonic acid ; the
lually increases, and in
he grain is ten degrees
urrounding atmosphere.
comes moist, and exhales
lour ; this is called the
maltster must keep the
becoming excessive, by
vary from fifty-five to
At the period of sweat-
ie grains begin to appear.
he sprouting of the roots,
the future stem, called
seen to lengthen. As
grain, the mealy part
isiderable change. The
nucilaginous matter is
moved, the colour be-
d the texture so loose
o powder between the
as this change is ac-
s the acrospire has come
of the seed, the process
ing the malt upon a kiln.
cleaned to separate the
are considered as inju-
malting generally in-
ree per cent. in bulk,
ne-fifth of its weight.

itsof, or *hospitallers*, *of St.*
a religiousmilitary order,
was in the island of Mal-
isted of three estates, the
s, and servants at arms ;
of the order was partly
partly aristocratical : the
ig sovereign. None were
order but such as were

antiquity, a cement of
two sorts, native and
the latter consisted of
r, and grease. Another
Romans in their aque-
fume slaked in wine,
melted pitch, and fresh
ha, called also *sea-wax*,
e found on the Lake
It is white, melts when
ooling assumes the con-
erate.

MALVA, *mallow*, a genus of the monadelphia polyandria class and order. Nat. ord. columniferæ. Calyx double, outer three-leaved ; caps. many, united in a depressed whorl, one-celled, one-seeded. There are thirty-four species, chiefly perennial herbaceous plants. The leaves are used in glysters, cataplasms, and fomentations.

MAMMÆ, the breasts of a female.

MAMMALIA, in natural history, the first class of animals in the Linnæan system : See *Zoology*.

MAMMARY *gland*, in anatomy, is a glandular substance situated in the breast, and secreting the milk.

MAMMEA, *mammee-tree*, a genus of the polygamia monoecia, or dioecia class and order. Nat. ord. guttiferæ. Cal. one leaved, two-parted ; cor. four-petalled ; berry very large, four-seeded. There is but one species, viz. M. americana, which bears a large rich-flavoured fruit.

MAMMILLARY. See *Anatomy*.

MAN. See *Homo*.

MANATI. See *Trichecus*.

MANCA, was a square piece of gold coin, commonly valued at 30 pence ; and mancum was as much as a mark of silver, having its name from manu cusa, being coined with the hand.

MANDAMUS, is a writ issuing in the King's name, out of the court of King's Bench, and directed to any person, corporation, or inferior court of judicature, commanding them to do some particular thing as appertaining to their office and duty.

MANDRAKE. See *Atropa*.

MANDREL, a kind of wooden pulley, making a member of the turner's lathe, of which there are several kinds.

MANETTIA, a genus of the tetrandria monogynia class and order. Nat. order, contortæ. Cal. eight-leaved ; cor. four-cleft ; caps. inferior, two-valved, one-celled ; seeds imbricate, orbicular, with a central seedlet. There are three species.

MANGANESE, a mineral generally found in the state of an oxide, either white, or black, or red. The white contains the smallest proportion of iron and of oxygen. This ore soon tarnishes in the air by absorbing oxygen. The red contains more iron than the white, and is crystalized. The black or the brown ore is frequently crystalized like the red. Manganese is procured in the metallic state, by reducing the oxide to powder, and forming it into a paste with water. It is then exposed to a strong heat, not less than 160 deg. of Wedgwood. In the metallic state, it is of a greyish white colour, with considerable brilliancy, and of a granular texture. Specific gravity 6.85. It is hard as iron ; one of the most brittle and most infusible of the metals. When exposed to the air, it is quickly tarnished, and at length falls into powder. When heated in the open air, it passes more rapidly through the different changes of colour in proportion as it combines with oxygen. Hence manganese, like some other metals, combines with different portions of oxygen, forming with it different oxides. The different coloured oxides are combined in the following proportions :

[illegible] it [illegible] into combination with the [illegible] with them [illegible] by the [illegible] None of them are decomposed by any of the other metals, which shews the strong affinity of manganese to oxygen. The pure alkalies favour the oxidation of manganese, and the decomposition of water, because they combine readily with this oxide. When the black oxide is exposed to heat, with twice its weight of dry soda or potash, a compound is formed of a dark green colour, which is soluble in water. During the solution this substance exhibits rapid changes of colour, and on that account has been denominated the "mineral cameleon." There is no action between manganese and any of the earths; but its oxide combines with them, and forms vitreous matters, which are of different colours, according to the degree of oxidation of the manganese, and its mixture with iron. The native black oxide of manganese is applied to several purposes. It is the substance from which oxygen can be most economically obtained, large quantities of which are consumed in the formation of the oxy-muriatic acid employed in the art of bleaching. It is used in glass-making to remove from the substance the green colour which is derived from the oxide of iron. Manganese, in a state of black oxide, gives a violet colour, but reduced to the white oxide the glass is colourless. In large quantities it is used in the composition of ornamental glass, to give a purple colour. It is likewise employed to give a black colour to earthenware, a quantity of it being mixed with the composition before it is baked.

MANGIFERA, a genus of the pentandria monogynia class and order. Nat. order terebintaceæ. Cor. five-petalled; drupe kidney form.

so that in a siege they may
fore the pioneers to shelter
e enemy's small shot.
RA, a genus of insects of the
era; antennæ filiform, the
cal; four feelers, filiform;
led before, emarginate be-
projecting; mandibles ex-
ls united without wings.
a single species, viz. M.
at inhabits the Cape of Good

genus of insects of the order
Head unsteady; mouth arm-
rs; feelers filiform; four
branaceous, convolute, the
ilaited fore legs compres-
or toothed beneath; armed
e claw and lateral-jointed
four hind ones smooth, and
alking; thorax (usually li-
ted and narrow. There are
0 species; the chief is M.
amel-cricket, which is found
ern parts of Europe, and is
beautiful green colour. It
e inches in length, of a slen-
nd in its general sitting-pos-
wed to hold up the two fore-
he act of devotion. This in-
redacious disposition, living
nsects, which it watches for
xiety; it is also very pug-
when kept with others of its
in a state of captivity, they
ch other with the utmost vio-
e is destroyed. The con-
rs his antagonist.
or *Mantling*, in heraldry,
ace of folding of cloth, flou-
drapery, that is in any
drawn about the coat of

A, in botany, a genus of the
giospermia class and order.
of personatæ. Pediculares,
ential character: calyx five-
lla with a five-parted, awl-
r, the four upper segments
ected; capsule two-celled,
. There are eighteen spe-
atives of the Cape of Good

See *Husbandry*.
ane figure, representing the
earth, or a part thereof.
ese three things are requi-
t all places have the same
distance from the great cir-
as on the globe, to shew their
gitudes, zones, climates, and
l appearances. 2. That their
be proportionable to their
des on the globe. 3. That all
he same situation, bearing,
, as on the earth itself.
hart performs the first and
very exactly, but fails extra-
he second; and indeed no
ion yet found can exhibit
o of them at once, by reason
difference between a plane
superficies.
not always to be used as they
, for sometimes any part is
but, generally, the top is the
e bottom the south, the right
, and the left hand the west.

The degrees of longitude are always numbered at top and bottom, and the degrees of latitude on the east and west sides. In all right-lined and general circular maps, except those of Wright's projection, the degrees of latitude on the sides are of an equal breadth; and in all circular and right-lined maps, except the said Wright's, and the plane charts, the degrees of longitude are unequal.

In general maps the circles corresponding to those in the heavens are inscribed, viz. the equator is expressed by a straight east and west line; and the first meridian, the polar circles, the tropics, and the other meridians and parallels, which are drawn at every five or ten degrees, intersect each other at right angles.

The most natural method of representing a sphere upon a plane seems to be, to divide it into two equal parts, and inscribe each of them in a circle: but as the equator and the polar axis, which intersects the circle at right angles, and makes one of the meridians, must be supposed equal in length to the half of the periphery (which is not quite two-thirds), it follows of course, that the countries delineated upon, or near, these lines, must be reduced to somewhat less than two-thirds of the size of the countries of equal extent, which lie at the extremity of the circle; and that the lines drawn to measure the latitude, which are parallel to each other, or nearly so, must, in order to preserve as nearly as possible their proportional angles at the points of intersection with the meridians, form segments of circles, of which no two are parallel or concentric.

There may be as many different projections as there are points of view in which a globe can be seen; but geographers have generally chosen those which represent the poles at the top and bottom of the map: these, from the delineation of the lines of latitude and longitude, are called the stereographic, orthographic, and globular projections. If the eye be supposed to view the earth from an infinite distance, the appearance represented on a plane, is called the orthographic projection. In this case, the parts about the middle are very well represented, but the extreme parts are contracted. In the stereographic projection the eye is supposed to be on the surface of the earth, and looking at the opposite hemisphere. There is likewise the globular projection in which meridians, equidistant upon the surface of the earth, are represented by equidistant circles in the map. Mercator's projection is that in which both the meridians and parallels of latitude are represented by straight lines. See *Projection*.

MAPLE. See *Acer* and *Sugar*.

MAPPI, a genus of the polyandria monogynia class and order. Cal. five-parted; cor. five-petalled; germ superior; berry one-seeded, seeds arilled. There is but one species, viz. M. guianensis.

MARANTA, *India arrow root*, a genus of the monandria monogynia class and order. Natural order of scitamineæ. Cal. three-leaved; cor. trifid; nect. three parted, the third part bearing the anther on its upper side. There are five species.

washed, pounded fine, and bleached, makes a powder and starch; it is recommended as a proper food for infants, and is gelatinous like salep. It is a native of South America, and is cultivated in the West Indies.

MARATTIA, a genus of the cryptogamia filices class and order. Natural order of filices or ferns. Caps. oval, gaping longitudinally at top, with several cells on each side. There are three species.

MARBLE, is a kind of stone, found in great masses, and dug out of pits or quarries. It is of so hard, compact, and fine a texture as readily to take a beautiful polish. There are infinite numbers of different kinds of marble. Some are of one simple colour, as white or black; others variegated with stains, clouds, waves, and veins: but all opaque, excepting the white, which, cut into thin pieces, becomes transparent. Marble is found in considerable quantities, in most of the mountainous parts of Europe. Derbyshire is that county of England most abounding in this article. Italy is that part of Europe which produces the most valuable marble. The black and the milk white marble, coming from Carara, a town in the duchy of Massa, are particularly esteemed.

MARBLE, *polishing of*, is performed by first rubbing it well with a freestone, or sand, till the strokes of the axe are worn off, then with pumice-stone, and afterwards with emery.

MARBLING, in general, the painting any thing with veins and clouds, so as to represent those of marble.

Marbling of books or paper is performed thus: dissolve four ounces of gum arabic into two quarts of fair water; then provide several colours mixed with water in pots or shells, and with pencils peculiar to each colour, sprinkle them by

MARE. See E
MARGARITAR
of the dioecia octa
Male, cal. four-to
led; female, cal.
styles four or fiv
four or five-grain
cies, a fleshy bulb

MARICA, a gen
nogynia class an
satæ. Cor. six-p
trifid. There is o
ludosa, a native
Guiana.

MARILLA, a
monogynia class
leaved; cor. fiv
celled, many-se
There is one spec
Indies.

MARINE, a ge
of a kingdom or
economy of naval
spects the buil
equipping, navig
ships.

MARINE *acid.*

MARINE-*chair*,
for viewing the
sea, and thereby
tude of their eclip

MARINE *rema*
press the shells of
crustaceous and o
in digging at grea
on the tops of hig

MARINE *surve*
chine, contrived
for measuring the
The machine is i
Y, and is made of
each end of the li
angle or upper pa
pallets, one of wh
portion as the oth
pendant pallet m

try, is one bounded by
ilme kingdom or state
considerable figure, or
t sea.
nerce, a certain note
puts upon his goods, or
gshead, &c. that con-
ler to distinguish them
s a grape, a crow's foot,
, an asterisk, &c.
, also denotes a weight
ites of Europe, and for
ies, especially gold and
the mark is divided in-
rachms, or 192 deniers
, or 160 esterlins, or
felins, or 4608 grains.
rk-weight is also called
equal to that of France.
er are sold by the mark,
caracts.
sed among us for a mo-
d in some other coun-
The English mark is two
sterling, or 13 shillings
nd the Scotch mark is
cotch money of account.
ed at Hamburgh, is also
t, equal to one-third of
h mark is divided into
k-lubs is also a *Danish*
ls-lubs. Mark is also a
coin in Sweden.
stablishment of public
f buying and selling,
nging to it, is one of the
s, and markets can on-
rtue of the King's grant
usage. All sales and
thing saleable in mar-
ot only be good as be-
, but binding also upon
g any property therein.
r shop in which goods
icly to sale, is market
ngs only as the owner
in. If a man buy his
arket, the contract shall
nless the property had
ltered by a former sale.
led into two sub-species,
rle, and the indurated
r is of a yellowish-grey
y employed for improv-
e latter is grey; it occurs
re is dull; it is opaque,
to the nail, easily fran-
ry heavy; it melts be-
pe into a blackish kind
sces with acids; it oc-
e floetz lime-stone, and
formations; in the first
beds of lime-stone, and
s in nests of it. It is
roving bad land; as also
e lime-stone is not easi-
elting of ores of iron.
of agriculture, marle is
the common, which in-
marle, and some varie-
ty; stone-marle, which
durated; slate marle,
indurated; shell-marle,
e earthy or indurated,
hells.
Letters of Marque.
or *Inlaid work*, is a curious work composed of several fine hard pieces of wood, of various colours, fastened in thin slices on a ground, and sometimes enriched with other matters, as silver, brass, tortoise shell, and ivory; The ground on which the pieces are to be arranged and glued, is usually of well dried oak, or deal, and is composed of several pieces, glued together, to prevent its warping. The wood to be used in marquetry is reduced into leaves, of the thickness of a line, or the twelfth part of an inch, and is either of its natural colour, or stained, or made black to form the shades by other methods: this some perform by putting it in sand heated very hot over the fire; others by steeping it in lime water and sublimate; and others in oil of sulphur. The wood being of the proper colours, the contours of the pieces are formed according to the parts of the design they are to represent.

The two chief instruments used in this work are a saw and a wooden vice, which has one of its chaps fixed, and the other moveable; which is open and shut by the foot, by means of a cord fastened to a treadle.

MARQUIS, a title of honour, next in dignity to that of duke, first given to these who commanded the marches, that is the borders and frontiers of countries.

MARRIAGE, is the lawful conjunction of man and wife.

Taking marriage in the light of a civil contract, the law treats it as it does all other contracts. By several statutes a penalty of 100*l.* is inflicted for marrying any persons without bans or licence; but by 26 George II. c. 33. if any person shall solemnize matrimony without bans or licence, obtained from some persons having authority to grant the same, or in any other place than a church, or chapel, where banns have been usually published, unless by special licence from the Archbishop of Canterbury, he shall be guilty of felony, and transported for 14 years, and the marriage shall be void. Marriages according to the laws of any other country are valid in England, if duly solemnized in another country, as marriages in Scotland are. Marriages by licence, where the parties are not 21, must not be without consent of the father or guardian of the party. If the guardian or mother is beyond sea, or insane, the Chancellor will proceed upon relation in their stead. Marriages cannot be solemnized between persons within the Levitical degrees; but if solemnized, they are not void till after sentence of the proper court. To marry an heiress, forcibly, is a capital felony

MARROW, in anatomy, a soft oleaginous substance contained in the cavity of the bones.

MARRUBIUM, in botany, *horehound*, a genus of the didynamia gymnospermia class and order. Nat. ord. of verticillatæ. Calyx salver shaped, rigid, ten-streak'd; corolla upper lip bifid, linear, straight There are 11 species.

MARS, the planet that revolves next beyond the earth in our system. See *Astronomy*.

MARSHAL, in its primary signification an officer who has the command or care the disposal of several coats of arms belonging to distinct families, in one and the same escutcheon or shield, together with their ornaments, parts, and appurtenances.

MARSHALSEA *court*, is a court of record originally instituted to hear and determine causes between the servants of the king's household, and others, within the verge; and has jurisdiction of things within the verge of the court, and of pleas of trespass, where either party is of the king's family, and of all other actions personal, wherein both parties are the king's servants; but the court has also the power to try all personal actions, as debt, trespass, &c. between party and party, within the liberty, which extends 12 miles about Whitehall. The judges of this court are the steward of the king's household, and knight-marshal for the time being. It sits every week, so that judgment can be obtained in a fortnight or three weeks. It has jurisdiction of all debts above as well as below 40s. But causes of importance, such as debts above 20l. may be removed into the court of king's bench or common pleas, by an *habeas corpus cum causa*.

MARSHMALLOW. See *Althæa*.

MARSH MARYGOLD. See *Caltha*.

MARSILEA, a genus of the cryptogamia miscellaneæ. Cal. common oval; cor. none; stamen, filaments none, anthers several, inserted round each pistil; pistil in each cell several; seeds as many as there are pistils; receptacle membrane somewhat fleshy, clothing the cells internally. There are 3 species.

MARTIN. See *Hirundo* and *Mustela*.

MARTLETS, in heraldry, little birds represented without feet, and used as a difference or mark of distinction for younger brothers.

MARTNETS, in a ship, small lines fastened to the leech of a sail, reeved through a block on the topmast head, and coming down by the mast to the deck. Their use is to bring the leech of the sail close to the yard to be furled.

bold; and navi-
the directions of

s *a king's ship*, an
rns, as the captain
e the petty officers
place and relieve,
ndles and fire put
aptain's orders, to
s are kept in good
e directions of the

r, since the dissolu-
the Templars, the
tor of the Temple
the denomination
successors.
robe, an officer un-
lain, who has the
&c.
See *Quarter*.
ANTS. In London
ode of hiring is by
d a month's warn-
s; that is, the par-
on either of them
month's notice for
n thereof, the par-
ion to pay or give
But if the hiring of a
ithout any particu-
ll be construed to
ar certain; and in
t depart before the
vages. And where
e year certain, and
long as both par-
the servant enter
he must serve out
merely a servant at
ear. If a woman
must nevertheless

oled in his master's
received through
master may recover
service.
ot only maintain an
who entices away
gainst his servant;
icement, a servant
hout just cause, an
another, who retains
dge of such depar-

to expect and exact
in all his lawful
enforce this he may
a reasonable man-

aster, a servant may
nother, and though
t is not murder, in
attack upon his mas-
y.
e, in many instan-
e master; and he is
when they are pur-
If a servant com-
s, by command or
s master, the master
But in so doing his
d, as he is bound to
such things only as
l. If a servant of an
master's guest, the
make good the loss
iun sell a man bad

wine, by which his health is impaired, an action will lie against the master. In like manner, if a servant be frequently permitted to do a thing, by the tacit consent of his master, the master will be liable. If a servant is usually sent upon trust with any tradesman, and he takes goods in the name of his master, upon his own account, the master must pay for them. And, also, if he is sent sometimes on trust, and at other times with money. But if a man usually deals with his tradesmen himself, or constantly pays them ready money, he is not answerable for what his servant may take up in his name. So it is if the master never had any personal dealings with the tradesmen, but the contracts have always been between the servant and the tradesman, and the master has regularly given his servant money for payment of every thing had on his account, the master shall not be charged. Or if a person forbid his tradesman to trust his servant on his account, and he continues to purchase upon credit, he is not liable. The act of a servant, though he has quitted his master's service, has been held to be binding upon the master, by reason of the former credit given him on his master's account, and its not being known to the party trusting that he was discharged. The master is also answerable for any injury arising by the fault or neglect of his servant when executing his master's business.

If a smith's servant lame a horse whilst shoeing him, or the servant of a surgeon make a wound worse, an action for damages will lie against the master, and not against the servant.

A master is likewise chargeable, for any nuisance occasioned by his servants, to the damage or annoyance of any individual, or the common nuisance of his majesty's subjects.

A servant is not answerable to his master for any loss which may happen without his wilful neglect; but if he be guilty of fraud or gross negligence, an action will lie against him by his master.

A master is not liable in trespass for the wilful act of his servant, as by driving his master's carriage against another, without the direction or assent of his master, no person being in the carriage when the act was done. But he is liable to answer for any damage arising to another from the negligence or unskilfulness of his servant acting in his employ, as for negligently driving against another.

MASTICATION, in medicine, the action of chewing, or of agitating the solid parts of our food between the teeth, by means of the motion of the jaws, the tongue, and the lips, whereby it is broken into small pieces, impregnated with saliva, and so fitted for deglutition and a more easy digestion.

MASTICH, in the materia medica, when pure is in the form of little round drops or tears, of a very pale amber. When slightly warmed this resin has a faint and rather pleasant odour, which becomes stronger and more grateful when it is melted. In Turkey, mastich is in great request among women as a masticatory. In other countries it is employed medically, in fumigations; and by painters and other artists in the composition of the tougher kinds of varnishes.

MASTOIDES, in anatomy, the same with mamillaris.

MATCH, a kind of rope slightly twisted, and prepared to retain fire for the uses of artillery, mines, fire-works, &c.

MATERIA MEDICA. The materia medica includes all those substances which may contribute to the restoration of health.

Various divisions and modes of classification of those articles which are used in medicine have been proposed and adopted by different authors. Some systematic writers arrange the articles of the materia medica according to their alphabetical order: others have taken for the basis of their arrangement the more sensible properties of drugs, as detected by the taste; thus reducing medicines to the different heads of bitterness, sweetness, astringency, acidity, &c.: while some have been regulated in their classification of medicinal articles, by their characters as objects in natural history. As, however, the study of the materia medica is merely the study of the medicinal properties of certain substances, it is evident that the method of arranging them as they agree in producing effects on the living system is the one best calculated to fulfil all its objects.

Table of Classifications

A. General stimulants.	
a. Diffusible.	Narcotics. Antispasmodics.
b. Permanent.	Tonics. Astringents.
B. Local stimulants.	Emetics. Cathartics. Emmenagogues. Diuretics. Diaphoretics. Expectorants. Sialagogues. Errhines. Epispastics.
C. Chemical remedies.	Refrigerants. Antacids. Lithontriptics. Escharotics.
D. Mechanical remedies	Anthelmintics. Demulcents. Diluents. Emollients.

Of Narcotics.

Narcotics are employed medicinally with different and opposite intentions. as stimulants they are given in various disorders of debility; in intermittent and continued fever, in gout, hysteria, epilepsy, dropsy, &c. As sedatives they are, administered to allay pain and irritation, and are consequently largely administered in spasmodic and painful affections.

Alcohol, ardent spirit; spirit of wine For the origin and preparation of this consult the article *Alcohol*. Moderate excitement, with proportionate subsequent languor, results from a moderate dose of spirits. In larger quantities it occasions intoxication, delirium, stupor, coma, death.

Alcohol is used externally as a stimulant in muscular pains, and as an useful application in the cure of burns. Internally it is seldom employed in medicine without dilution; and then either [illegible] liary or solvent of other [illegible].

Ether.—Ethers bear some [illegible] in their medicinal powers [illegible] they are more diffusible, and [illegible] nent in their operation. They [illegible] ployed principally in asthma, [illegible] and other spasmodic [illegible] from half a drachm to one [illegible] Externally applied, [illegible] lieve spasmodic contraction of [illegible] cles, and head-ache.

Camphora, laurus camphora [illegible] habitat, Japan. India.

In a moderate dose camphor [illegible] lant; in a larger quantity [illegible] diminishes the force of the [illegible] and induces sleep.

Camphor has been said [illegible] in typhus, cynanche maligna, [illegible] affections attended with [illegible] lation; as a sedative in [illegible] rheumatism, &c. In mania [illegible] given as an anodyne. As an [illegible] dic it is employed in asthma, St. [illegible] dance, and epilepsy. In [illegible] to twenty grains. Externally, [illegible] tion with oil or liquid opium, [illegible] has been advantageously [illegible] matism, bruises, and other [illegible] affections.

Papaver somniferum, poppy. [illegible] Asia. The concrete juice [illegible] of this plant is opium, chiefly [illegible] from Egypt, Turkey, and the [illegible]

The effects of opium are [illegible] it often occasions, when given [illegible] what large doses, intoxication, [illegible] actual delirium. If a larger [illegible] the symptoms of diminished [illegible] pear without any previous [illegible] and are succeeded by [illegible] stertorous breathing, [illegible] death.

Where opium is given as a [illegible] ought to be administered [illegible] frequently repeated doses. [illegible] intention is to mitigate pain [illegible] it ought to be given in a [illegible] at distant intervals. In [illegible] as intermitting fevers, opium [illegible] a stimulus. In the [illegible] the discharge. In gout it is [illegible] viceable. In convulsive and [illegible] affections it is often administered [illegible] great extent. In lues venerea [illegible] to accelerate the action of mercury [illegible] often given to promote suppuration [illegible] is extremely efficacious in [illegible] grene. In the form of enema [illegible] often administered in [illegible] the bowels. Usual dose is one grain [illegible] adult.

Hyoscyamus niger, indigenous, [illegible] or the herb, semen, or the seed, black [illegible] bane. This plant, in its action [illegible] system, bears a considerable resemblance to opium: but is free from its constipating effects.

Atropa belladonna, indigenous, [illegible] nightshade. Its leaves and berries and root are narcotic. It is seldom used in medicine.

Aconitum napellus, aconite, [illegible] hood, herba. Europe, America. [illegible] nite has been employed in [illegible] tic rheumatism, in schirrus, &c. [illegible]

of the powdered
tated juice half a

cicuta, hemlock,
men, indigenous.
tic. Dose two or
dered leaves ; one
l juice.
glove, folia, indi-
arcotics, digitalis
rtainly diminishes
, especially of the
same time as a
ent system ; hence
lately it has been
in phthisis. Dose
lered leaves, and
ure of the Edin-
gradually increas-

bacco, folia, Ame-
l narcotic.
g-scented lettuce,
n five to ten grains
gradually increas-
s narcotic, diure-

horn apple, herba,
been used in ma-
nvulsive diseases.
rains of the inspis-

ard's-bane, flores,
Germany. The
in the dose of five

anthum, yellow-
folia, Siberia. This
ronic rheumatism

poison-oak, folia.
leaves have been
lf a grain twice or

a, vomica nut, E.
mployed in mania,
re grains twice a

, cherry-tree-lau-

modica.
a kind of interme-
cotics and tonics.
th of Asia. Musk
found in a small
bilicus in the male
His antispasmodic
e. Dose from six
form of bolus : it
r quantities in the
rom dentition.
astor fiber. This
l in cells near the
in the beaver. It
s. Dose from ten to

yreumaticum, em-
This is nearly dis-

n of a red colour,
is not now, much

n employed alone
given in the form

assafœtida, Persia.
tained by incision
e plants. Its dose,
rains.

Sagapenum, gummi-resina, Persia ; virtues the same as assafœtida, but inferior in power.

Bubon galbanum, gummi-resina, Africa. Dose ten grains.

Valeriana officinalis, wild valerian : radix, indigenous. Dose from one scruple to one drachm, three or four times a day.

Crocus sativus, saffron indigenous. It has scarcely any virtue.

Melaleucha leucadendron, cajeput oil, India. This is scarcely in use, except as a local application in the tooth-ache.

Of Tonics.

The agency of tonics is not that of increasing tension or tone, but they are permanent stimulants to the living fibre. Tonics, then, are properly regarded as slow and durable, in opposition to the more diffusible and transient stimuli. They are chosen from the mineral and vegetable kingdom.

From the miner al Kingdom.

Hydrargyrus, argentum vivum, mercury. Ferrum, iron. Zincum, zinc. Cuprum, copper. Arsenicum, arsenic. See *Pharmacy* and *Medicine.*

Barytes, terra ponderosa, heavy earth. This has only been used in medicine combined with muriatic acid. Dose from five to twenty or more drops.

Calx, lime. This earth exists in nature as a carbonate ; it has been used as a tonic in combination with muriatic acid.

Acidum nitricum, nitric acid. This acid has been used as a tonic to support the system under a mercurial course.

Oxymurias potassæ, oxymuriate of potash. This may be classed as a remedy with the former article. Dose, ten grains increased to twenty or twenty-five.

Tonics from the vegetable Kingdom.

The tonic faculty in vegetables is intimately united with certain sensible qualities, with bitterness, astringency, and aroma.

Cinchona officinalis, cortex Peruvianus, Peruvian bark, Peru. Three kinds of this bark are in use, the pale, red, and yellow. The last is now principally employed, as it gives out more bitterness and astringency to water, alcohol, and other media. Peruvian bark was first employed in intermittent fever. In this disease it is given in the dose of a scruple or half a drachm every third hour during the interval of the paroxysm. In continued fever it is principally employed during the latter stages, when debility is urgent. In rheumatism, erysipelas, gangrene, hæmorrhage, and almost all asthenic disorders, it has been administered as a tonic.

Cinchona Caribæa, Caribeean bark, Caribee islands. Angustura, Spanish West Indies. These barks have been used as substitutes for the Peruvian.

Aristolochia serpentaria, Virginian snake root. This stimulating aromatic tonic is generally given in the form of tincture.

Dorstenia contrayerva, contrayerva, Peru, West Indies. This is scarcely possessed of any virtue.

Croton eleutheria, cascarilla cortex, N. America. This is another substitute for Peruvian bark. Dose a scruple or half a drachm.

y little employed as a me- [illegible]

scus, mastiche, resina, [illegible] is likewise discarded

[illegible] *Astringents.*

[illegible] These are the mineral acids [illegible] sulphuric and its com- [illegible] metals and earths.

sulphuricum, vitriolic acid, [illegible] moptysis, menorrhagia, [illegible] &c. Dose from ten to [illegible] ed.

rea, argillaceous earth with [illegible], forming the boles, of which the armenian bole, were for- [illegible] ployed, but are now rejected [illegible] as nearly inert.

[illegible] argillæ et potassæ, alum. [illegible] hæmorrhage, and serous evacua- [illegible] from five to fifteen grains.

[illegible], calx viva, quick lime. Lime [illegible] employed as an astringent in the [illegible] me water.

[illegible] carbonate of lime. The [illegible] of lime are chalk [illegible] aws (chelæ cancrorum) [illegible] a treorum, [illegible] are [illegible] than [illegible]

[illegible] lead. This in the form of [illegible] is evidently an [illegible]

[illegible]

Nicotiana tabacum, tobacco. This is a violent emetic, as well as narcotic. It is scarcely ever employed in practice.

From the mineral Kingdom

Antimonium, stibium, antimony. See *Pharmacy and Medicine.*

Sulphas zinci, sulphate of zinc. This salt is sudden in its operat[illegible] in principal use in cases of poisons having been received into the stomach. Dose from ten grains to a scruple.

Sulphas cupri, sulphate of copper. Neither this nor the acetite of copper is in much use; they are violent in their operation.

Of Cathartics.

A discharge of the intestinal contents appears to be occasioned by [illegible] upon [illegible] either immediately [illegible] intestines, thus accel[illegible] stalic motion, and [illegible] more [illegible] or they [illegible] the exhalant [illegible] immediately by stimulating [illegible] and secerning vessels. Cathartics [illegible] [illegible] important changes [illegible] may be divided into [illegible]

Purgatives.

Cassia [illegible] in the form of [illegible]

[illegible]

drachms.

Tamarindus Indica, tamarind, fructus conditus, E. and W. Indies, America, Arabia. It may be taken to the extent of two ounces or more.

Ricinis communis, palma Christi, oleum, semen, W. Indies. The oil from the nuts of palma Christi is the castor oil of the shops. This is a mild and very useful purgative.

Sulphur, a simple inflammable substance, and magnesia, either pure or carbonated, are all the laxatives that are afforded by the mineral kingdom. The operation of either is exceedingly mild.

For the neutral salts employed as purgatives, see *Pharmacy*.

The purgatives that are administered only in the form of enema, are the

Murias sodæ, common salt. An ounce of this dissolved in a pint of tepid water with an ounce of expressed oil, forms the common domestic enema.

Terebinthina veneta, turpentine, pinus larix, gummi-resina. This is sometimes employed as an enema triturated with the yolk of an egg. It is indicated in obstinate costiveness.

Nicotiana.—The introduction per anum of tobacco-smoke has sometimes been effectual in procuring alvine evacuation, after other cathartics have failed. The infusion of from one to two drachms in a pint of water is a more convenient mode of administering it. Much caution is requisite in either case to obviate its injurious effects.

Of Emmenagogues.

These are medicines which promote the menstrual discharge.

Emmenagogues from the class of tonics.

Ferrum, the carbonate of iron, rubigo, ferri præparata; is given in a dose of ten or fifteen grains in amenorrhœa; the sulphate of iron in three or four grains.

Hydrargyrus, the mild muriate of mercury.

Cinchona, frequently given in conjunc-

menagogue.

Of Diur

Diuretics are those
augment the urinary
effect is either produce
mulus communicated
a sympathetic excitme
from a previous acc
stomach, or, lastly, by
absorption.

Saline diur

Superlartris potassæ,
Dose four or six drachm
considerable quantity of

Nitras potassæ, nitre.
to twenty grains.

Murias ammoniæ, cru
Dose from eight grains t

Acetis potassæ, sal
has now likewise fallen

Potassa kali.—The do
thirty grains.

Vegetable D

Scilla maritima.—D
three or four grains.

Digitalis purpurea.—
grain to two or more,
leaves; from ten to t
saturated tincture. Th
be regulated and incr
caution.

Lactuca virosa.—Do
to three drachms.

Colchicum autumnale,
indigenous. Given in

Gratiola officinalis, he
of Europe. Given in d

Spartium scoparium,
nous. The broom tops
have proved advantage

Juniperus communis.
indigenous. Juniper b
have a considerable diu

Copaifera officinalis,
South America. Do
thirty drops twice a day

Pinus larix. Venice

MATERIA MEDICA

extent, is called diaph[illegible] and sudorific powers [illegible] degree. They neces[illegible] directly or indirectly ex[illegible] as excitants. The [illegible] appear [illegible] the leading means [illegible] to procure sweat in the [illegible]

[illegible] preparations are [illegible] under proper re[illegible]

[illegible] administered [illegible]

[illegible]

[illegible] formed medicines. [illegible]

[illegible] administered [illegible]

[illegible] given [illegible]

[illegible] stimulant [illegible]

[illegible] about a drachm [illegible] in pieces and swallowed [illegible] recommended in paralysis, asthma, and dropsy. [illegible] stimulant and [illegible]

[illegible]

[illegible] is employed in the second [illegible]

Ammoniacum, ammoniac, East Indies, gummi-resina. Dose from ten to thirty grains. This is frequently used as an expectorant.

Assafœtida.—Dose from ten to twenty grains.

Myrrha, myrrh, gummi resina, Abyssinia and Arabia. Dose from ten to twenty grains.

N. B. The plants producing the above two gum resins are unknown.

Styrax benzoin, benzoin or Benjamin balsamum, East Indies. Dose ten to fifteen grains.

Styrax officinale, storax, bals[illegible] south of [illegible] Storax is like benzoin in [illegible]

Toluifera balsamum, balsam of tolu, South America. Its powers are very inconsiderable.

Myroxylon peruiferum, Peruvian balsam, South America. Dose in asthma, leucorrhœa, &c. from five to fifteen grains.

Amyris gileadensis, balm of Gilead, Arabia. Its qualities nearly resemble the balsam of tolu.

Of Sialagogues.

These are substances which increase the secretion of saliva.

Hydrargyrus.—All the preparations of mercury [illegible] influence over the salivary glands.

[illegible]

Meloe vesicatorius, cantharis, Spanish fly. This is the principal substance employed for blistering. Cantharides in the form of tincture may be employed simply as a rubefacient.

Ammonia with oil, forms a liniment for this purpose.

Pinus albus, Burgundy pitch, resina. This is used in the form of plaster, in chronic affections of the lungs and chest.

Sinapsis, mustard. The flour of mustard-seed mixed with crumbs of bread, and made into a paste with vinegar, forms a sinapism, a powerful rubefacient. It is applied to the soles of the feet in cases of pressing debility.

Allium, garlick. The bruised root of this plant is used for similar purposes with the mustard sinapism.

Refrigerants,

Medicines directly lowering the temperature of the body. See *Physiology* and *Medicine*.

Of refrigerants, the vegetable acids are the most efficacious.

Citrus aurantium, orange, succus fructus. The acidity of China orange is connected with sweetness, of the orange from Seville with bitterness. The former is used as a refrigerant in fever.

Citrus medica, lemon, succus fructus. The juice of the lemon is composed of citric acid, and saccharine and mucilaginous matter. It is the most powerful and agreeable of the refrigerants. With carbonate of potass, (kali prep.) it forms the saline draught.

Tamarindus indica.—Tamarind is a very pleasant refrigerant.

Acidum acetosum, vinegar, used principally as a substitute for the lemon-juice.

Supertartris potassæ, cream of tartar.

Nitras potassæ, a refrigerant dose from five grains to a scruple.

Antacids.

Alkalies.—Pure potass in solution is employed to correct acidity, in doses of 15 drops in water. The carbonates of potass and soda are, however, in more general use for this purpose.

Aqua ammoniæ is given likewise with this intent. Dose from 20 to 40 drops.

Aqua calcis.—Lime-water is also used to correct acidity: six or eight ounces being taken occasionally.

Carbonas calcis.—Of this there are two varieties, creta alba, (prepared chalk) and cheliæ cancrorum (crab's claws). These are principally used in the diarrhœa of infants.

Magnesia, (carbonas magnesiæ,) is in some instances preferable to chalk as an antacid, as it proves slightly purgative.

Of Lithontriptics.

Medicines supposed to have a power of dissolving stone in the bladder.

Potassa, potass.—The dose of the solution of pure potass is 15 to 20 drops gradually increased. The form in which it is generally employed as a lithontriptic, is in the supersaturated solution. Dose, one or two pounds daily.

Soda.—This is likewise used in the form of saturated solution, under the name of soda water. Dose, one or two pounds.

Sapo albus.—Soap is a combination of
expressed oil with potass or sod
one or two ounces in the cours
day.

Calx.—Lime-water is sometim
ployed as a lithontriptic.

Escharotics.

Are substances which destroy
ture of both living and dead ma
ter. They are employed to con
crescences, or to open ulcers.

Potassa, in its solid state, is a
escharotic; mixed with lime i
what milder.

Nitras argenti.—Lunar caust
in common use.

Murias antimonii.—A powerf
but inconvenient from its bo
form.

Sulphas cupri is often emplo

Acetis cupri. (Verdigris.)
der than the sulphate.

Murias hydrargyri. Princi
in venereal ulcers.

Subnitras hydrargyri.—Em
the same intention as the mur

Oxydum arsenici albi.—A
white arsenic is sometimes
as an external application to

Juniperus sabina.—Savine
applied in the form of oint
nate ulcers. It is used in po
sume warts.

Anthelmintics.

Medicines employed to
from the intestinal canal.

Dolichos pruriens, cowhag
Indies. This substance
growing on the pods of the

Ferrum, iron.—The filings

Stannum, tin.—This is us
of powder. Tin may perha
a mechanical power. Dos
drachms.

Olea Europæa, olive oil,
sum, south of Europe. Dos

Artemisia santonica, w
sia. Dose half a drachm.

Spigelia marilandica, Ind
North America. Dose, half

Polypodium filix mas, m
indigenous. Dose two or th

Tanacetum vulgare, tans
indigenous. Dose, from
drachm.

Geoffroia inermis, cabb
cortex, Jamaica. Dose 30

Gambogia.—Dose from
grains.

Submurias hydrargiri
perhaps the most efficaci
thelmentics. Dose ten or
an adult.

Demulcents

Are substances employ
to shield from acrimony.

Mimosa nilotica, gum
This is used to allay the
fauces in catarrh. It is
tenesmus, strangury, &c.

Astragalus tragacant
south of Europe, Asia.
similar to gum arabic.

Linum usitatissimum,
digenous. Used in gon
tarrh.

Althæa officinalis, mar
indigenous.

vestris, common mallow, folia,

iza glabra, liquorice, radix,
urope. These three last are
emulcents.

rinalis, sago. East Indies. This
from the pith of the tree; it is
in dysentery, &c. as demul-
t the same time nutritive.
mascula, salop, indigenous. Si-
irtue to sago.
arundinacea, South America.
ot is demulcent, and slightly nu-

n hybernum. wheat, amylum.
useful as an enema with opium
ery, &c.
cervi rasura, hartshorn shav-

colla, isinglass, is obtained from
nds of fish. Isinglass is a demul-
equent use.
livæ.—The expressed oil princi-
ed as a demulcent is obtained
fruit of the olive.
dalus communis, almond oil. Ol.
South of Europe.
a ceti.—Spermaceti is obtained
e head of a certain species of
Like the almond oil, it is given as
cent in catarrh, &c.
wax.—This is collected from the
of vegetables by bees. This is
lly employed in the composition
ents and plasters.
luents and Emollients the two re-
classes scarcely any thing remains
ion. Water, strictly speaking, is
y diluent, and emollients are
formed of heat combined with
e, as in fomentations and cata-
or of unctuous substances, as lard
a porcina) and the varieties of
ed oils.

THEMATICS, originally signifies
cipline or learning; but, at present
that science which teaches of con-
es, whatever is capable of being
red or measured, in so far as is com-
or measurable, and, accordingly,
vided into arithmetic, which has
rs for its object, and geometry,
reats of magnitude. See *Arithme-*
Geometry.
ematics are commonly distinguish-
pure and speculative, which consi-
antity abstractedly; and mixed,
reat of magnitude as subsisting in
l bodies, and consequently are inter-
every where with physical consi-
ons. Mixed mathematics are very
ehensive; since to them may be re-
astronomy, optics, geography, hy-
phy, hydrostatics, mechanics, for-
on, navigation, &c.

TRASS. See *Cucurbit.*

TRICARIA, in botany, *feverfew*, a
of the syngenesia polygamia super-
ass and order. Nat. ord. composi-
coideæ. Calyx, hemispherical, im-
e; marginal scales solid, sharpish;
none; receptacle naked. There are
species. These are herbaceous
s, with leaves mostly pinnate, in some
imple; flowers terminating either in
abs, or almost solitary; florets in the
commonly white. M. parthenium, common feverfew, is a native of many parts of Europe, in waste places, in hedges and wells, sometimes in cornfields and gardens, where it is also cultivated in a double state.

MATRIX, in anatomy, the same with uterus.

MATRIX, in letter foundry. See *Type.*

MATRIX, or mother earth, the stone in which metallic ores are found inveloped.

MATROSSES, are soldiers in the train of artillery, who are next to the gunners, and assist them in loading, firing, and spunging the great guns.

MATT, in a ship, rope-yarn, junk, &c. beat flat and interwoven; used in order to preserve the yards from galling or rubbing in hoisting or lowering them.

MATTER, in physiology, whatever is extended and capable of making resistance.

That matter is one and the same thing in all bodies, and that all the variety we observe arises from the various forms and shapes it puts on, seems very probable, and may be concluded from a general observation of the procedure of nature in the generation and destruction of bodies.

According to Sir Isaac Newton, it seems highly probable that God in the beginning formed matter into solid, massy, impenetrable, moveable particles or atoms of such sizes and figures, and with such other properties, and in such proportion to space as most conduced to the end for which he formed them; and that these primitive particles being solids are incomparably harder than any porous bodies compounded of them, even so hard as never to wear or break in pieces, no ordinary power being able to divide what God himself made one in the first creation.

MATTHIOLA, a genus of the pentandria monogynia class and order. Nat. ord. rubiaceæ, calyx entire; corolla tubular, superior, undivided; drupe with a globular nucleus. There is one species, viz. M. scabra, a native of America.

MATTUSCHKÆA, a genus of the tetrandria monogynia class and order. Calyx four-parted, with linear leaflets; corolla one-petalled, with a long tube and four-cleft border; germ superior, four-cleft; seeds four, naked. There is but one species, viz. M. hirsuta, found in Guiana.

MAUNDY *Thursday*, is the Thursday in Passion Week, which was called Maunday or Mandate Thursday, from the command which our Saviour gave his apostles to commemorate him in the Lord's Supper, which he this day instituted; or from the new commandment which he gave them to love one another, after he had washed their feet as a token of his love to them.

MAURITIA, a genus belonging to the natural order of palmæ. Male in an oblong sessile ament; calyx one-leafed, cup-shaped, entire; corolla one-petalled, filaments six. There is but one species.

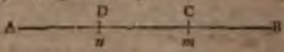
MAXILLA, the jaws, or those parts of an animal in which the teeth are set.

MAXIM, an established proposition or principle, in which sense it denotes much the same with axiom. See *Axiom.*

MAXILLA. See *Anatomy*.

MAXIMUM, in mathematics, denotes the greatest quantity attainable in a given case. If a quantity conceived to be generated by motion, increases, or decreases, till it arrives at a certain magnitude or position, and then, on the contrary, grows less or greater, and it be required to determine the said magnitude or position, the question is called a problem de maximis et minimis.

Thus, let a point *m* move uniformly in a right line, from A towards B, and let another point *n* move after it, with a velocity either increasing or decreasing, but so that it may, at a certain position D, become equal to that of the former point *m*, moving uniformly.



This being premised, let the motion of *n* be first considered as an increasing one; in which case the distance of *n* behind *m* will continually increase, till the two points arrive at the contemporary positions C and D; but afterwards it will again decrease; for the motion of *n* till then being slower than at D, it is also slower than that of the preceding point *m* (by the hypothesis), but becoming quicker afterwards than that of *m*, the distance *m n* (as has been already said) will again decrease, and therefore is a maximum, or the greatest of all, when the celerities of the two points are equal to each other.

But if *n* arrives at D with a decreasing celerity, then its motion being first swifter, and afterwards slower, than that of *m*, the distance *m n* will first decrease and then increase, and therefore is a minimum, or the least of all, in the forementioned circumstance. Since, then, the distance *m n* is a maximum, or a minimum, when the velocities of *m* and *n* are equal, or when that distance increases as fast through the motion of *m* as it decreases by that of *n*, its fluxion at that instant is evidently equal to nothing. Therefore, as the motion of the points *m* and *n* may be conceived such that their distance *m n* may express the measure of any variable quantity whatever, it follows, that the fluxion of any variable quantity whatever, when a maximum or a minimum, is equal to nothing.

The rule therefore to determine any flowing quantity in an equation proposed, to an extreme value, is, having put the equation into fluxions, let the fluxion of that quantity whose extreme value is sought be supposed equal to nothing; by which means all those members of the equation in which it is found will vanish, and the remaining ones will give the determination of the maximum or minimum required. See *Fluxions*.

MEAD, an agreeable liquor made of honey and water.

Take four gallons of water, and as much honey as will make it bear an egg; add the rind of three lemons, boil and scum it. Then take it off the fire, and add the three lemons cut in pieces; pour it into an open vessel, and let it work for three days; then scum it well, and pour off the clear part into a cask, and let it stand open till it ceases to make a hissing noise; [illegible] stop it up close, and in three months [illegible] it will be fine, and fit for bottling.

MEADOW. See *Husbandry*.

MEAN, a middle state between two extremes; as a mean motion, [illegible] arithmetical mean, geometrical mean, [illegible]

Arithmetical mean, is half the sum of the extremes. So, 4 is an arithmetical mean between 2 and 6, or between 3 and 5, or between 1 and 7; also an arithmetical mean between *a* and *b* is $\frac{a+b}{2}$, or $\frac{1}{2}a +$ $\frac{1}{2}b$.

Geometrical Mean, usually called a mean proportional, is the square root of the product of the two extremes. To find a mean proportional between two given extremes, multiply these together, and extract the square root of the product. Thus, a mean proportional between 1 and 9, is $\sqrt{1\times 9}=\sqrt{9}=3$; a mean between 2 and $4\frac{1}{2}$ is $\sqrt{2\times 4\frac{1}{2}}=\sqrt{9}=3$; also, the mean between 4 and 6 is $\sqrt{4\times 6}=\sqrt{24}$; and the mean between *a* and *b* is $\sqrt{ab}$.

The geometrical mean is always less than the arithmetical mean between the same two extremes. So the arithmetical mean between 2 and $4\frac{1}{2}$ is $3\frac{1}{4}$, but the geometrical mean is 3. To prove this generally, let *a* and *b* be any two terms, *a* the greater, and *b* the less; then universally, the arithmetical mean $\frac{a+b}{2}$ shall be greater than the geometrical mean $\sqrt{ab}$, or $a + b$ greater than $2\sqrt{ab}$. For, by

squaring both, they are $\Big\}$ $a^2+2ab+b^2 > 4ab$

subst. 4ab from each, then $\Big\}$ $a^2-2ab+b^2 > 0$

that is, $(a-b)^2 > 0$

To find a Mean Proportional geometrically, between two given lines M and N. Join the two given lines together in one continued line AB; upon the diameter AB describe a semi-circle, and erect the perpendicular CD; which will be the mean proportional between AC and CB, or M and N.

To find two Mean Proportionals between two given extremes. Multiply each extreme by the square of the other, viz. the greater extreme by the square of the less, and the less extreme by the square of the greater; then extract the cube root of each product, and the two roots will be the two mean proportionals sought. That is, $\sqrt[3]{a^2b}$ and $\sqrt[3]{ab^2}$ are the two means between *a* and *b*. So, between and 16, the two mean proportionals are

$\sqrt{2^2 \times 16} = \sqrt[3]{64} = 4$,

$= \sqrt[3]{512} = 8.$

ean, is double a fourth
the sum of the extremes,
remes themselves *a* and
eciprocal of the arithme-
een the reciprocals of the

e *Medicine*.
geometry, denotes any
d as one, or unity, to
of other homogenous or
s is expressed.
m angle, is an arch descri-
tex in any place between

a figure, or plane surface,
e side is one inch, foot,
her determinate length.
icians, it is usually a rod
e rod, divided into ten
the square feet into ten
ence square measures.
a line, any right line taken
considered as unity.
he mass, or quantity of mat
s, is its weight.
a number, in arithmetic,
is divides another without
tion.
a solid, is a cube whose
, foot, yard, or any other
gth. In geometry, it is
vided into cubic feet, di-

velocity, in mechanics, the
er by a moving body in a

horses, is the hand, which
ns four inches.
lso used to signify the ca-
observed in poetry, danc-

a legal and commercial
s, according to the various
sions of the things mea-

, *or measures of application*.
and Scotch standards.
neal standard is the yard,
lish feet, equal to 3 Paris
-twelfths of an inch, or
is ell.
and is divided into 37 in-
inch and foot are larger
, in the proportion of 180
ots ell, though forbidden
sed for measuring some
ties, and is the foundation
ure of Scotland.
sure is the same both in
cotland. The length of
poles, or 22 yards; 80
ile.

The reel for yarn is two and a half yards or 10 quarters, in circuit; 120 threads make a cut, 12 cuts make a hasp or hank and 4 hanks make a spindle.

English Measures.

	Inches.
A foot is	12
A yard	36
A pole, or rod	198
A furlong	7920
A mile	63360
A link	7.92
A chain	792
A nail of cloth	2¼
A quarter	9
A yard	36
An ell	45
A hand	4
	Square yards
An acre	4840

The wine gallon is fixed at 231 cubic inches by an act passed in the reign of Queen Anne, consequently,

	Cubic Inches.
A pint is	28.875
A quart	57.75
A barrel	7276.5
A hogshead	14553.
A pint of country ale, or beer measure, is	35.25
A quart	70.5
A gallon	282.
A barrel, beer measure, is	10152.
——— ale ditto	9024.
——— country ditto	9588.
A hogshead, beer measure is	15228.
——— ale ditto	13536.
——— country ditto	14382.
A pint, dry measure, is	33.6
A quart	67.2
A pottle	134.4
A gallon	268.8
A peck	537.6
A Winchester bushel	2150.42
A heaped bushel is one third more.	
A quarter	17203.36

A wey, or load, is five quarters; and two loads make a last of wheat.

Sixty pounds is the mean weight of a bushel of wheat, 50 of barley, and 38 of oats.

Thirty-six heaped bushels make a chaldron of coals, which generally weigh about 2988 pounds.

2. The French standard was formerly the aune or ell, containing 3 Paris feet, 7 inches, 8 lines, or 1 yard 2-sevenths English; the Paris foot royal exceeding the English by 68-thousandth parts. This ell is divided two ways, viz. into halves, thirds, sixths, and twelfths; and into quarters, half-quarters, and sixteenths.

The French however have formed an entirely new system of weights and measures according to the following table.

MEASURES

TABLE.

NCIPAL MEASURES OR UNITIES.

acity.	Weight.	Agrarian.	For firewood.
ire.	Gramme.	Are.	Stere.
etre cube.	Weight of a centimetre cube of distilled water.	100 square metres.	One cubic metre.
and one , or 1 li- onefourth	18 grains and 841,000 parts.	Two square perches des eaux et foret.	demi-voie, or one fourth of a cord des eaux et foret.
Inches, more than and less quart.	22,966 grains.	11,968 square yards.	

	English Inches.
Millometre	.03937
Centimetre........	.39371
Decimetre	3.93710
Metre	39.37100
Decametre.	393.71000
Hecatometre......	3937.10000
Chiliometre	39371.00000
Myriometre.......	393710.00000

The metre is 1.09364 yards, or nearly a yard 1½ nail, or 443.2959 lines French, or .513074 toises.

A decametre is 10 yards, 2 feet, 9.7 inches.

A hecatometre, 109 yards, 1 foot, 1 inch.

A chiliometre, 4 furlongs, 213 yards, 1 foot or 10.2 inches.

A micrometre, 6 miles, 1 furlong, 156 yards, 6 inches.

Eight chiliometres are nearly five miles.

An inch is .0254 metre; 2441 inches, 62 metres; 1000 feet, nearly 305 metres.

An are, a square decametre, is 3.95 perches.

A hecatre, 2 acres, 1 rood, 35.4 perches.

	Cubic inches English.
Millilitre	.06103
Centilitre.	.61028
Decilitre.	6.10280
Litre, a cubic decimitre	61.02800
Decalitre	610.28000
Hecatolitre	6102.80000
Chiliolitre.	61028.00000
Myriolitre	610280.00000

Two and 1-eighth wine pints are about a litre; 3 wine pints are nearly 14 decilitres; a chiliolitre is one tun, 12.75 wine gallons.

3.5317 cubic feet make a decistere, a measure for firewood.

A stere, a cubic metre, 35.3171. A Paris foot is equal to 12.785 inches.

3. The standard in Holland, Flanders, Sweden, a good part of Germany, many of the Hanse-towns, as Dantzic and Hamburgh, and at Geneva, Franckfort, &c. is likewise the ell; but the ell in all these places differs from the Paris ell. In Holland it contains one Paris foot 11 lines, or 4-sevenths of the Paris ell. The Flanders ell contains 2 feet 1 inch 5 lines and half a line, or 7-twelfths of the Paris ell. The ell of Germany, Brabant, &c. is equal to that of Flanders.

4. The Italian measure is
brace, or fathom. At Ven
Modena, and Mantua, it con
foot, 1 inches 3 lines, or 8-fif
Paris ell. At Lucca 1 Paris f
10 lines, or half a Paris ell.
foot, 9 inches, four lines, or
of a Paris ell. At Milan,
measuring of silks is 1 Paris
4 lines, or 4 ninths of a Paris
woollen cloths is the same w
Holland. At Bergamo, the
foot, 7 inches 6 lines or 5-nin
ell. The usual measure at
in Sicily is the canna, contai
inches, and 2 lines, or one
15-seventeenths.

5. The Spanish measure i
yard, containing 17 twenty
Paris ell. But the measure
Valencia is the pan, span, or
is used, together with the
noa. In Arragon, the vara
Paris ell and a half, or 5 fee
lines.

6. The Portuguese measur
dos, containing 2 feet 11 l
sevenths of a Paris ell; and
whereof make a 100 Paris e

7. The Muscovite measur
bit, equal to 1 Paris foot, 4
lines; and the arcin, two
equal to 3 cubits.

8. The Turkish and Levant
the piq, containing 2 feet, 2
lines, or three-fifths of the
Chinese measure is the cob
of are equal to three Paris e
and some parts of the Indie
which there are two kin
gueze, called also the gue
containing 2 Paris feet, 10 i
or four-fifths of the Paris ell
er gueze, called simply gue
thirds of the former. At Go
the measure is the vara,
that of the Portugueze.
some other parts of the Ind
or candi, equal to the ell
Siam, they use the ken, shor
ris feet by one inch. The
two soks, the sok two keub
nious or inches, the niou to
grains of rice, *i. e.* to about

English Measures of Length.

Barley-corns										
3	Inch									
9	3	Palm								
27	9	3	Span							
36	12	4	1 1-3d	Foot						
54	18	6	2	1½	Cubit					
108	36	12	4	3	2	Yard				
180	60	20	6 2-3d	5	3 1-3d	1 2-3d	Pace			
216	72	24	8	5	4	2	$1\frac{1}{5}$	Fathom		
594	198	6	22	16½	11	5½	$3\frac{3}{10}$	2¾	Pole	
23760	7920	2640	880	660	440	220	132	110	40	Fu
190080	63360	2112	7040	5280	3520	1760	1056	880	3	

MEASURES

Scripture Measures of Length reduced to English.

								English feet.	Inch. Dec.
Digit								0	0.912
4	Palm							0	3.648
12	3	Span						0	10.944
24	6	2	Cubit					1	9.888
96	24	8	4	Fathom				7	3.552
144	36	12	6	1½	Ezechiel's reed			10	11.328
192	48	16	8	2	1⅓	Arabian pole		14	7.104
1920	480	160	80	20	13⅓	10	Schœnus, or measuring line	145	11.04

The longer Scripture Measures.

				English miles.	English paces.	feet.
Cubit				0	0	1.824
400	Stadium			0	145	4.6
2000	5	Sab. day's journey		0	729	3.000
4000	10	2	Eastern mile	1	403	1.000

												English Paces.	Feet.	dec.
Dactylus, digit												0	0	0.7554$\frac{3}{16}$
4	Doron, dochme											0	0	3.0218 $\frac{3}{4}$
10	$2\frac{1}{2}$	Lichas										3	0	7.5546 $\frac{7}{8}$
11	$2\frac{3}{4}$	$1\frac{1}{10}$	Orthodoron									0	0	8.3101$\frac{9}{16}$
12	3	$1\frac{1}{5}$	$1\frac{1}{11}$	Spithame								0	0	0.0656 $\frac{1}{4}$
16	4	$1\frac{6}{10}$	$1\frac{5}{11}$	$1\frac{1}{3}$	Foot							0	1	0.0875
18	$4\frac{1}{2}$	$1\frac{4}{5}$	$1\frac{7}{11}$	$1\frac{1}{2}$	$1\frac{1}{8}$	Cubit						0	1	1.5984 $\frac{3}{8}$
20	5	2	$1\frac{9}{11}$	$1\frac{2}{3}$	$1\frac{1}{4}$	$1\frac{1}{9}$	Pygon					0	1	3.109 $\frac{3}{8}$
24	6	$2\frac{2}{5}$	$2\frac{2}{11}$	2	$1\frac{1}{2}$	$1\frac{1}{3}$	$1\frac{1}{5}$	Cubit larger				0	1	6.13125
96	24	$9\frac{3}{5}$	$8\frac{8}{11}$	8	6	$5\frac{1}{3}$	$4\frac{4}{5}$	4	Pace			0	6	0.525
9600	2400	960	$872\frac{8}{11}$	800	600	$5331\frac{1}{3}$	480	400	100	Furlong				
76800	19200	7680	$6981\frac{9}{11}$	6400	4800	$4266\frac{2}{3}$	3840	3200	800	8	Mile		5	

Οργυια .. 6 feet.

MEASURES

A TABLE

Of the Measures of Length of the principal Places in Europe, compared with the English Yard.

		Eng. yard.
100	Aunes, or ells of England, equal to	125
100	of Holland or Amsterdam	75
100	of Brabant or Antwerp	76
100	of France	128⅓
100	of Hamburg, Francfort, &c.	62½
100	of Breslau	60
100	of Dantzick	59⅜
100	of Bergen and Drontheim	68¼
100	of Sweden or Stockholm	64⅞
100	of St. Gall, for linens	87⅛
100	of ditto, cloths	67
100	of Geneva	124⅔
100	Cannes of Marseilles and Montpellier	214⅓
100	of Toulouse & High Languedoc.	200
100	of Genoa, of 9 palms	245½
100	of Rome	217½

		Eng. yd.
100	Varas of Spain	[illegible]
100	of Portugal	[illegible]
100	Cavidos of Portugal	[illegible]
100	Braccas of Venice	[illegible]
100	of Bergamo, &c.	[illegible]
100	of Florence and Leghorn	[illegible]
100	of Milan	[illegible]

N. B. The aunes or ells of Amsterdam, Haerlem, Leyden, the Hague, Rotterdam, and other cities of Holland, as also that of Nuremberg, being all equal, are comprehended under that of Amsterdam; as those of Osnaburg are under those of Breslau; and those of Bern and Basil are equal to those of Hamburg, Francfort and Leipsic.

Square or Superficial Measure. English square or superficial measures are raised from the yard of 36 inches multiplied into itself.

English Square Measure.

Inches					
144	Foot				
1296	9	Yard			
3600	25	2 7/9	Pace		
39204	272¼	30¼	10 89/100	Pole	

MEASURES

English Measure of Capacity for Liquids.—Wine Measure.

Solid inches										
28⅞	Pint									
231	8	Gallon								
4158	144	18	Runlet							
7276½	252	31½	1 1-3	Barrel						
9702	336	42	2⅓	1⅓	Tierce					
14553	504	63	3½	2	1½	Hogshead				
19279	672	84	4⅔	2⅔	2	1⅓	Puncheon			
29106	1008	126	7	4	3	2	1½	Butt		
58212	2016	252	14	8	6	4	3	2	Tun.	

ish Measures of Capacity for Liquids, reduced to English Wine Measure.

					Gall.	Pint.	Solid inches.
					0	0 ⅝	0.177
					0	0 ⅚	0.211
				Cab	0	3 1-3d	0.344
3				Hin	1	2	2.533
6	2			Seah	2	4	5.067
18	6	3		Bath, or Epha	7	4	15.2
180	60	30	10	Coron, or Chomer	75	5	7.625

c Measures of Capacity for Liquids, reduced to English Wine Measure.

									Gall.	Pints.	Solid inch.	Dec.
								m	0	$\frac{1}{120}$	0.0356	$\frac{5}{12}$
								eme	0	$\frac{1}{60}$	0.0712	$\frac{5}{6}$
1¼								Mystron	0	$\frac{1}{48}$	0.089	$\frac{11}{48}$
2½	2							Conche	0	$\frac{1}{24}$	0.178	$\frac{11}{24}$
5	4	2						Cyathos	0	$\frac{1}{12}$	0.356	$\frac{11}{12}$
7½	6	3	1½					Oxybaphon	0	⅛	0.535	⅜
30	24	12	6	4				Cotyle	0	½	2.141	½
60	48	24	12	8	2			Xestes	0	1	4.283	
60	288	144	72	48	12	6		Chous	0	6	25.698	
20	3416	1728	864	576	144	72	12	Metretes	10	2	19.629	

MEASURES

Roman Measures of Capacity for Liquids, reduced to English Wine Measure.

										Gall.	Pints.	Solid inch.
Ligula										0	0 $\frac{1}{48}$	0.11
4	Cyathus									0	0 $\frac{1}{12}$	0.46
6	1½	Acetabulum								0	0 ⅛	0.70
12	3	2	Quartarius							0	0 ¼	1.40
24	6	4	2	Hemina						0	0 ½	2.5
48	12	8	4	2	Sextarius					0	1	5.6
288	72	48	24	12	6	Congius				0	7	4.9
1152	288	192	96	48	24	4	Urna			3	4 ½	5.3
2304	576	384	192	96	48	8	2	Amphora		7	1	1.06
46080	11520	7680	3840	1920	960	160	40	20	Culeus	143	3	11.0

English Beer and Ale Measure.

Pints	
8	Gallon

English Dry or Corn Mea

Solid inches	
33.6	Pint

asures of Capacity for things dry, reduced to English Corn Measure.

					Peck.	Gal.	Pint.	Solid inch.	Dec.
					0	0	0	0.276	$\frac{7}{20}$
					0	0	0	2.763½	
xybaphon					0	0	0	4.144	
4	Cotyle				0	0	0	16.579	
8	2	Xestes			0	0	0	158	
12	3	1½	Choenix		0	0	1	15.705¼	
576	144	72	48	Medimnos	4	0	6	3.501	

asures of Capacity for things dry, reduced to English Corn Measure.

					Peck.	Gal.	Pint.	Solid inch. Dec.
					0	0	0 $\frac{1}{48}$	0.01
					0	0	0 $\frac{1}{12}$	0.04
cetabalum					0	0	0⅛	0.05
4	Hemina				0	0	0½	0.24
8	2	Sextarius			0	0	1	0.48
64	16	8	Semimodius		0	1	0	3.84
128	32	16	2	Modius	1	0	3	7.68

DITORIUS. See *Anatomy*.
L, in mathematics, de-
tion of some problem, by
instruments.
L *curve*, is a curve ac-
Cartes, which cannot be
lgebraic equation.
, that branch of practical
ich considers motion and
their nature and laws,
in machines. It is dis-
actical and rational me-

hanics comprehend the
motion, shews when the
are given how to deter-
that are produced by
ersely when the pheno-
otions are given, how to
rs or forces from which

anics treats of the mecha-
simple engines that ena-
weights, to move heavy
ome resistances, which
do with their natural

this science, it will be
to take some things for
not strictly true: and
is established, to make
ances for them.
portion of the earth's surface, which is spherical, may be considered as a plane. 2. That all bodies be supposed to descend in lines parallel to each other. 3. That all planes be considered as perfectly smooth; levers to be inflexible, and without thickness or weight, cords perfectly pliable; and machines without friction and inertia.

Three things are always to be considered in treating of mechanical engines; the weight to be raised, the power by which it is to be raised, and the instrument or engine by which this is to be effected.

The mechanical powers are generally reckoned six: the lever, the pulley, the wheel and the axis, the inclined plane, the wedge and the screw.

These perhaps may be reduced to two, for the pulley and wheel are only assemblages of levers, and the wedge and screw are inclined planes.

The *lever* is the simplest of all machines, and is only a straight bar of iron, wood, or other material, supported on and movable round, a prop called the fulcrum

In the lever there are three circumstances to be principally attended to: 1. The fulcrum, or prop, by which it is supported or on which it turns as an axis, or centre of motion: 2, The power to raise and support the weight: 3. The resistance or weight to be raised or sustained.

used for loosening large stones; or to raise great weights to small heights. ABC, Plate Mechanics, fig. 1. is this lever, in which B is the fulcrum, A the end at which the power is applied, and C the end where the weight acts.

To find when an equilibrium will take place between the power and the weight, in this as well as in every other species of lever, it is necessary to recollect, that when the momenta, or quantities of force, in two bodies are equal, they will balance each other. Now let us consider when this will take place in the lever. Suppose the lever AB (fig. 2.) to be turned on its axis, or fulcrum, so as to come into the situation DC, as the end D is farthest from the centre of motion, and as it has moved through the arch AD in the same time as the end B moved through the arch BC, it is evident that the velocity of AB must have been greater than that of B. But the momenta being the products of the quantities of matter multiplied into the velocities, the greater the velocity, the less the quantity of matter need be to get the same product. Therefore, as the velocity of A is the greatest, it will require less matter to produce an equilibrium than B.

Let us next see how much more weight B will require than A to balance it. As the radii of circles are in proportion to their circumferences, they are also proportionate to similar parts of them; therefore as the arches AD, CB, are similar, the the radius or arm DE, bears the same proportion to EC that the arch AD bears to CB. But the arches AD and CB represent the velocities of the ends of the lever, because they are the spaces which they moved over in the same time; therefore the arms DE and EC may also represent these velocities.

It is evident then, that an equilibrium will take place when the length of the arm AE multiplied into the power A shall equal EB multiplied into the weight B;

oars, rudders of ships,
hinges, cutting-knives
thepoint, &c.

If in this lever we sup
weight to change place
may be between the we
it will become a lever
in which, that there ma
tween the power and
tensity of the power m
tensity of the weight ju
distance of the weight f
ceeds the distance of
let E (fig. 4.) be the pro
and W a weight of one
timesas far from the p
acts at F, by the cord
ed pulley D : in this c
be equal to three poun
port the weight of one

To this sort of lever
ferred the bones of
when he lifts a weigh
muscle that exerts its
weight is fixed to the
tenth part as far b
the hand is. And th
centre round which th
arm turns, the muscle
ert a force ten times a
that is raised.

What is called the ha
in nothing but its for
the first kind. Its nam
its use, that of drawing
by a hammer.

Let ACB (fig. 5.) rep
this sort, bent at C, w
centre of motion. P is
on the longer arm AC
of the cord DA going
and W is a weight or r
on the end B of the s
the power is to the we
they are in equilibrio
to be five pounds, ac
of one foot from the c

h these powers that
weight by the help of
used singly and apart
ve to the weight. For
ower which can sustain
he help of the lever A,
as 1 to 5; and if the
sustain the same weight
one, is to the weight as
power which could sus-
ght by the lever C, is to
5; then the power which
eight by the help of the
ed together, will be to the
ortion consisting of the
ns multiplied together,
nd 1 to 5; that is of 1 to

e lever A, a power equal
weight P pressing down
sufficient to balance the
ce it is the same thing
er is applied to the le-
e lever B at S, the point
point L; a power equal
weight P being applied
f the lever B, will sup-
; but one-fourth of the
g applied to the point L
d pushing the same up-
effectually depress the
me lever, as if the whole
ied at S; consequently a
one-fourth of one-fifth,
ieth of the weight P,
o the point L of the le-
ing up the same, will
ight; in like manner
ether that force is ap-
t L of the lever B, or
he lever C, since if S be
ests on it, must be raised
h of the power applied
the lever C, and press-
, will as effectually raise
e same lever, as if the
e applied at S, and pushed
sequently a power equal
e-twentieth, that is, one-
f the weight P, being ap-
t L of the lever C, will
ht at the point S of the

n instrument of very ex-
mparing the weights of
of the first kind, whose
al length. The points
weights are suspended
tant from the centre of
ve with equal velocity;
qual weights are appli-
a will be equal, and the
in in equilibrio.
e a balance as perfect as
essary to attend to the
tances: 1. The arms of
o be exactly equal, both
l length. 1. The points
les are suspended should
passing through the cen-
e beam. 3. The fulcrum
e placed a little above
ity. Its vibrations will
its horizontal tendency
er the centre of gravity,
e weight upon the points

of the beam upon the axis

ought to be as little as possible; because, should the friction be great, it will require a considerable force to overcome it. The axis of motion should be formed with an edge like a knife, and made very hard; these edges are at first made sharp, and hen rounded with a fine hone, or piece f buff leather, which causes a sufficient obtuseness, or rolling edge.

5. The pivots which form the axis or fulcrum, should be in a straight line, and at right angles to the beam. 6. The arms should be as long as possible, relatively to their thickness, and the purposes for which they are intended. They should also be made as stiff and inflexible as possible; for if the beam is too weak, it will bend, and become untrue.

7. The rings, or the piece on which the axis bears, should be hard and well polished, parallel to each other, and of an oval form, that the axis may always keep its proper bearing, or remain always at the lowest point.

The statera, or Roman steelyard, fig. 7 is a lever of the first kind, and is used for finding the weights of different bodies, by one single weight placed at different distances from the prop or centre of motion D, for the shorter arm DG is of such a weight as exactly to counterpoise the longer arm DX. If this arm is divided into as many equal parts as it will contain, each equal to GD, the single weight P (which we may suppose to be one pound will serve for weighing any thing as heavy as itself, or as many times heavier as there are divisions in the arm DX, or any quantity between its own weight and that quantity. As for example, if P is one pound and placed at the first division 1 in the arm DX, it will balance one pound in the scale at W; if it is removed to the second division at 2, it will balance two pounds in the scale; if to the third three pounds; and so on to the end of the arm DP. If any of these integral divisions is subdivided into as many equal parts as a pound contains ounces, and the weight P is placed at any of these subdivisions, so as to counterpoise what is in the scale, the pounds and odd ounces therein will by that means be ascertained.

The wheel and axle is a machine much used, and is made in a variety of forms. It consists of a wheel with an axle fixed to it, so as to turn round with it; the power being applied at the circumference of the wheel, and the weight to be raised is fastened to a rope with coils round the axle.

AB (fig. 9) is a wheel and CD an axle fixed to it, and which moves round with it. If the rope which goes round the wheel is pulled, and the wheel turned once round, it is evident that as much rope will be drawn off as the circumference of the wheel: but while the wheel turns once round, the axle turns once round; and consequently the rope by which the weight is suspended, will wind once round the axis, and the weight will be raised through a space equal to the circumference of the axis.

The velocity of the power, therefore, will be to that of the weight, as the circumference of the wheel to that of the axis.

That the power and the weight may be

in equilibrio, therefore, the power must be to the weight as the circumference of the wheel to that of the axis.

The circumferences of different circles bear the same proportion to each other as their respective diameters do; consequently the power is to the weight, as the diameter also of the axis to that of the wheel.

Thus, suppose the diameter of the wheel to be eight inches, and the diameter of the axis to be one inch; then one ounce acting as the power P, will balance eight ounces as a weight W; and a small additional force will cause the wheel to turn with its axis, and raise the weight; and for every inch which the weight rises, the power will fall eight inches.

The wheel and axis may be considered as a kind of perpetual lever, of which the fulcrum is the centre of the axis, and the long and short arms are the diameter of the wheel and the diameter of the axis. See fig. 10.

From this it is evident, that the larger the wheel, and the smaller the axis, the stronger is the power of this machine; but then the weight must rise slower in proportion.

A capstan is a cylinder of wood, with holes in it, into which are put bars, or levers, to turn it round; these are like the spokes of a wheel without the rim. Sometimes the axis is turned by a winch fastened to it, which in this respect serves for a wheel; and is more powerful in proportion to the largeness of the circle it describes, compared with the diameter of the axle.

When the parts of the axis differ in thickness, and weights are suspended at the different parts, they may be sustained by one and the same power applied to the circumference of the wheel; provided the product arising from the multiplication of the power into the diameter of the wheel, is equal to the sum of the products arising from the multiplication of the several weights into the diameters of those parts of the axis from which they are suspended.

In considering the theory of the wheel and axle, we have supposed the rope that goes round the axle to have no sensible thickness; but as in practice this cannot be the case, if it is a thick rope, or if there are several folds of it round the axis, you must measure to the middle of the outside rope, to obtain the diameter of the axis, for the distance of the weight from the centre is increased by the coiling up of the rope.

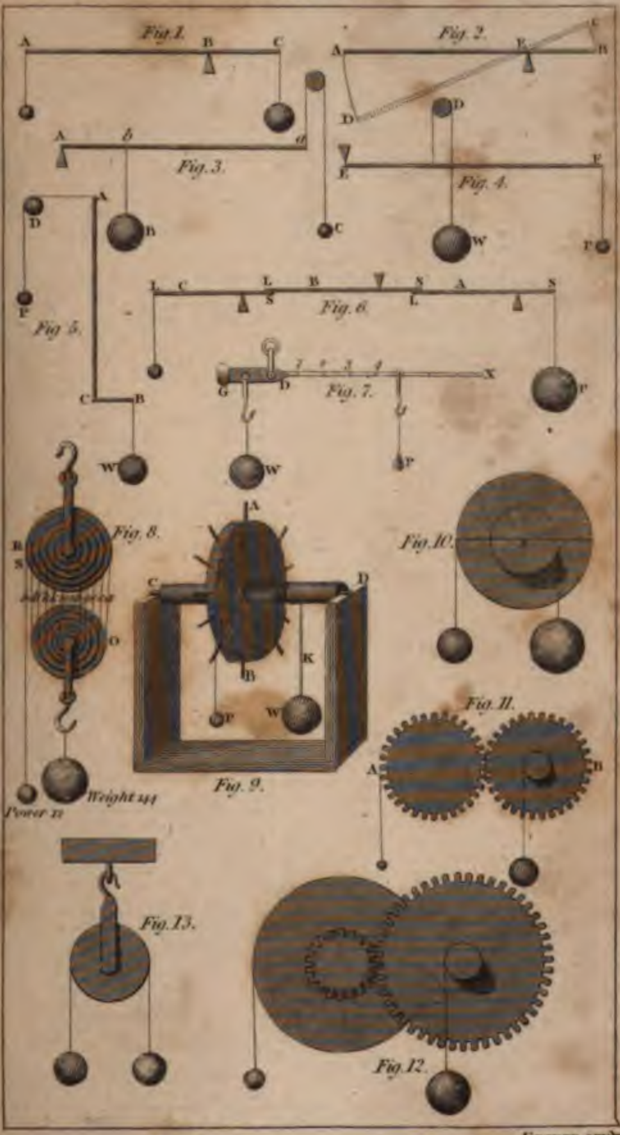
If teeth are cut in the circumference of a wheel, and if they work in the teeth of another wheel of the same size, as fig. 11, it is evident that both the wheels will revolve in the same time; and the weight appended to the axle of the wheel B, will be raised in the same time as if the axle had been fixed to the wheel A. But if the teeth of the second wheel are made to work in teeth made in the axle of the first, as at fig. 12, as every part of the circumference of the second wheel is applied successively to the circumference of the axle of the first, and the former is much greater than the latter, it is evident that the first wheel must go round as many times more than the second, as the circumference of the second wheel exceeds that of the first axle.

In order to a balance here, the power must be to the weight, as the product of the circumferences, or diameters of the two axles multiplied together, is to the circumferences or diameters of the two wheels.

This will become sufficiently clear, if it is considered as a compound lever, which was explained above. Instead of a combination of two wheels, three or four wheels may work in each other, or any number; and by thus increasing the number of wheels, or by proportioning the wheels to the axis, any degree of power may be acquired.

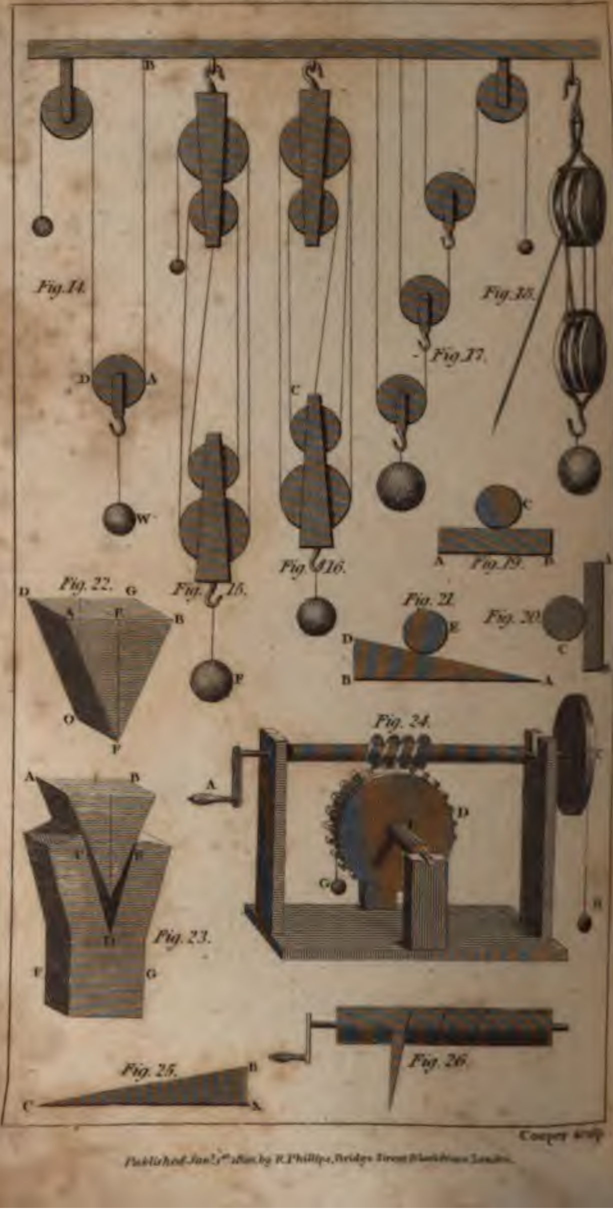
To this sort of engine belong all cranes for raising great weights; and in this case the wheel may have cogs all round it, instead of handles; and a small lanthorn, or trundle, may be made to work in the cogs, and be turned by a winch, which will make the power of the engine to exceed the power of the man who works it, as much as the number of revolutions of the winch exceeds those of the axle CD, fig. 9, when multiplied by the excess of the length of the winch above the length of the semidiameter of the axle, added to the semidiameter or half thickness of the rope K, by which the weight is drawn up. Thus, suppose the diameter of the rope and axle taken together to be thirteen inches, and consequently half their diameter to be 6½ inches, so that the weight W will hang 6½ inches perpendicular distance from below the centre of the axle. Now, let us suppose the wheel AB, which is fixed on the axle, to have 80 cogs, and to be turned by means of a winch 6½ inches long, fixed on the axle of a trundle of eight staves or rounds, working in the cogs of the wheel; here it is plain, that the winch and trundle would make ten revolutions for one of the wheel AB, and its axis CD, on which the rope K winds in raising the weight W; and the winch being no longer than the sum of the semidiameters of the great axle and rope, the trundle could have no more power on the wheel than a man could have by pulling it round by the edge, because the winch would have no greater velocity than the edge of the wheel has, which we here suppose to be ten times as great as the velocity of the rising weight; so that, in this case, the power gained would be as 10 is to 1. But if the length of the winch is 13 inches, the power gained will be as twenty to one; if 19½ inches (which is long enough for any man to work by), the power gained will be as 30 to 1; that is, a man could raise 30 times as much by such an engine, as he could do by his natural strength without it, because the velocity of the handle of the winch would be 30 times as great as the velocity of the rising weight, the absolute force of any engine being in the proportion of the velocity of the power, to the velocity of the weight raised by it. But then, just as much power or advantage as is gained by the engine, so much time is lost in working it, which is common in all mechanical cases whatever.

In this sort of machinery it is requisite to have a ratchet wheel on the end of the



Cooper sculp.

Published Jan.y 1st 1812, by R. Phillips, Bridge Street, Blackfriars, London.



Cowper sculp.

Published Jan.y 1st 1810, by R. Phillips, Bridge Street Blackfriars London.

MECHANICS

catch to fall into its teeth; any time support the weight in descending if the person handle should, through in-[illegible] carelessness, quit his hold [illegible] is rising. By this means is prevented which might given by the running down when left at liberty.

s a small wheel turning on and a swing rope passing over it, which is usually called a is so fixed in a box, or moveable round a pin passing its centre.

e of two kinds;—1. Fixed, move not out of their places; which rise and fall with

lley is fixed, as fig 14. two [illegible] the end of a over it, will balance each [illegible] stretch the rope equally, and [illegible] pulled down through space, the other will rise equal space in the same time; [illegible] the velocities of both [illegible] must balance each other. [illegible] pulley, therefore, gives no advantage; so that you can greater weight by it than you your natural strength. [illegible] in changing the direction [illegible] times enabling [illegible] more convenience. By raise a weight to any point, [illegible] from the place [illegible] otherwise he would have been [illegible] with the weight, it also [illegible] men together to apply [illegible] to the weight by means of

ble pulley represented at A fixed to the weight W, and with it. In comparing this [illegible] must be consider-[illegible] weight acts upon the cen-power is applied at the extre-ever D. The power, therefore, as far from the fulcrum as the the proportion between the weight, in order to balance must be as 1 to 2. Whence [illegible] the use of this pulley dou-ver, and that a man may raise much by it as by his strength [illegible] may be considered this way. [illegible] pulley hangs by two [illegible] stretched, and which must, [illegible] bear equal parts of the [illegible] rope AB being made fast [illegible] weight is sustained by it; and [illegible] the rope, to which the [illegible] has but half the weight; consequently the advantage [illegible] pulley is as 2 to 1.

e upper and fixed block con-[illegible] pulleys, which only turn upon [illegible] and the lower movable block [illegible] two, which not only turn on [illegible] rise with the weight F [illegible] advantage gained is as [illegible] pulley will be acted upon [illegible] part of the weight, and the [illegible] pulley that moves [illegible] the case of power [illegible] by which F may be sustained [illegible] to half *the weight divi*[illegible]

by the number of lower pulleys; that is, as twice the number of lower pulleys is to 1, so is the weight suspended to the power.

But if the extremity C (fig. 1[illegible]) is fixed to the lower block, it will sustain half as much as a pulley, consequently here the rule will be, as twice the number of pulleys adding unity is to 1, so is the weight to the power.

These rules hold good, whatever may be the number of pulleys in the blocks.

If, instead of one rope going round all the pulleys, the rope belonging to each pulley is made fast at top, as in fig. 17, a different proportion between the power and the weight will take place. Here it is evident, that each pulley doubles the power; that, if there are two pulleys, the power will sustain four times the weight.

Fig. 8, is the concentric pulley, invented by Mr James White. Q, R, are two brass blocks, in which grooves are cut; and round these a cord is passed, by which means they answer the purpose of so many distinct pulleys. The advantage gained is found by doubling the number of grooves in the lower block.

It is common to place all the pulleys in each block on the same pin, by the side of each other, as in fig. 18; but the advantage, and rule for the power, are the same here as in figs. 15 and 16.

A pair of blocks with the rope fastened round it, is commonly called a tackle.

The *inclined plane*. This mechanical power is of very great use in rolling up heavy bodies, such as casks, wheelbarrows, &c. It is formed by placing boards, or earth, in a sloping direction.

The force wherewith a body descends upon an inclined plane is to the force of its absolute gravity, by which it would descend perpendicularly in free space, as the height of the plane is to its length. If we suppose the plane AB (fig. 19) to be parallel to the horizon, the cylinder C will rest on any part of the plane where it is laid. If the plane is placed perpendicularly, as AB, fig. [illegible], the cylinder C will descend with its whole force of gravity, because the plane contributes nothing to its support or hindrance; and therefore it would require a power equal to its whole weight to keep it from descending.

Let AB (fig. 21) be a plane parallel to the horizon, and [illegible] a plane inclined to it, and suppose the whole length AD to be three times as great as the perpendicular DB. In this case the cylinder E will be supported upon the plane DA, and kept from rolling, by a power equal to a third part of the weight of the cylinder, therefore a weight may be rolled up this inclined plane, by a third part of the power which would be sufficient to draw it up by the side of [illegible] upright wall.

It is thus evident, that the less the angle of elevation, or the gentler the ascent [illegible] the greater the weight [illegible]; for the [illegible] inclined plane [illegible] part of the weight [illegible] tendency which the weight has [illegible] the [illegible] power [illegible] gained by this mechanical power, [illegible] cularly on its back. Thus A B (fig. 23) is a wedge driven into the cleft CED of the wood FG

When the wood does not cleave at any distance before the wedge, there will be an equilibrium between the power impelling the wedge downward, and the resistance of the wood acting against the two sides of the wedge, when the power is to the resistance as half the thickness of the wedge at its back is to the length of either of its sides. because the resistance then acts perpendicular to the sides of the wedge. But when the resistance on each side acts parallel to the back, the power that balances the resistance on both sides will be, as the length of the whole back of the wedge is to double its perpendicular height.

When the wood cleaves at any distance before the wedge (as it generally does), the power impelling the wedge will not be to the resistance of the wood as the length of the back of the wedge is to the length of both its sides, but as half the length of the back is to the length of either side of the cleft, estimated from the top or acting part of the wedge. For, if we suppose the wedge to be lengthened down from the top CE, to the bottom of the cleft at D, the same proportion will hold; namely, that the power will be to the resistance as half the length of the back of the wedge is to the length of either of its sides: or, which amounts to the same thing, as the whole length of the back is to the length of both of the sides.

The wedge is a very great mechanical power, since not only wood, but even rocks, can be split by it; which it would be impossible to effect by the lever, wheel, and axle, or pulley; for the force of the blow, or stroke, shakes the cohering parts and thereby makes them separate more,

[illegible] is equal to no
gle pound, will balance
ing against the screw; an
tional force as is suffici
the friction, will raise t
and the velocity of the po
the velocity of the weigh
Hence it appears, that
which is, and the neare
to one another, so muc
the force of the screw.

A machine for shew
power of the screw may
the following manner:—
have a screw (fig. 24) on
in the teeth of the whee
pose to be 48 in number.
for every time the whee
turned round by the win
will be moved one tooth
therefore in 48 revolution
the wheel D will be tur
Then, if the circumferen
scribed by the handle of
equal to the circumfere
round the wheel D, th
handle will be 48 times
velocity of any given po
Consequently, if a line G
groove, and has a weight
to it, a power equal to 1 p
dle will balance and sup
To prove this by experi
cumferences of the groov
C and D be equal to o
then if a weight H, of 1 p
ed by a line going roun
the wheel C, it will bala
48 pounds hanging by th
small addition to the we
it to descend, and so rai
weight.

If a line G, instead of
groove of the wheel D, go
I, the power of the ma

outside screw; being
ıer, as to have a promi-
ound the cylinder in a
hich prominent part is
of the screw; the other
d the female or inside
ody containing a hollow
oncave surface is cut in
us the convex surface of
so that the prominent
ay fit the concave parts

able degree of friction
it the power in a screw;
npensated by other ad-
his account the screw
n a weight; even after
oved, or ceases to act,
he body against which it
: the screw will sustain
; insomuch that several
pplied, would support
whilst the foundation is
ved.

ved Machines.

lent from the principle
ut any one of the me-
capable of overcoming
le resistance, in theory;
used singly for produ-
effects, they would be
vieldy and unmanage-
it impossible to apply
reason it is generally
intageous to combine
which means the power
plied, and many other
ained. In all machines
compound, what is gain-
t in time. Suppose that
pulley raises a beam to
: in two minutes, it is
ie able to raise six beams
:s; but by means of a
lower pulleys, he will
s at once, with the same
raised one; but then
:s as long about it, that is,
thus the work is per-
me time, whether the
r is used or not. But
ained by the power is
he six beams are joined
be raised by the tackle
be impossible to move
ssisted strength of one

of force is obtained by
ıvances; on the con-
ı, and other causes, force
by machines we are able
nvenient direction to the
nd so modify its energy
cts which it could not
this modification.
mposed of several of the
s, the power will be to
ı they are in equilibrio,
ormed by the multiplica-
l proportions which the
e weight in every sepa-
power of which the ma-

ichines, simplicity ought
attended to; for a com-
is not only more expen-
t to be out of order, but
eater degree of friction,

in proportion to the number of rubbing parts.

Whatever may be the construction of a machine, its power will always be in proportion to the velocity of the power to the weight; and so that this is obtained in the greatest degree that circumstances will admit, or that are necessary, then the fewer parts the better.

If you have any number of wheels acting on so many pinions, you must divide the product of the teeth in the wheels by those in the pinions; and the quotient will give the number of turns of the last pinion in one turn of the first wheel. Thus, if a wheel A (fig. 27) of 48, acts on a pinion B of 8, on whose axis there is a wheel C of 40, driving a pinion D of 6, carrying a wheel E of 36, which moves a pinion F of six, carrying an index; then the number of turns made by the index, will be found in this manner: $\frac{48}{8} \times \frac{40}{6} \times \frac{36}{6} = \frac{60120}{288} = 240$, the number of turns which the index will make while the wheel A goes once round.

Any number of teeth on the wheels and pinions having the same ratio, will give the same number of revolutions to an axis: thus, $\frac{64}{10} \times \frac{50}{8} \times \frac{36}{6} = \frac{115200}{480} = 240$, as before. It therefore depends upon the skill of the engineer, or mechanic, to determine what numbers will suit his design.

It is evident, that the same motion may be performed, either by one wheel and pinion, or by many wheels and pinions, provided the number of turns of all the wheels bear the same proportion to all the pinions which that one wheel bears to its pinion.

When a wheel is moved immediately by the power, it is called a leader; and if there is another wheel on the same axis it is called the follower. Thus A, being moved immediately by the power, is to be considered as a leader, and B as a follower, the wheel C being driven by B, becomes a leader and D a follower; E (fig. 28) is a leader, and the cylinder F may be considered as a follower.

Sometimes the same wheel acts both as a leader, and a follower; as in fig. 29, where B is moved by A, and consequently is a follower, while, as it drives C, it is also a leader. Therefore, as to multiply both the divisors and dividend by the same number does not alter the quotient in mechanical calculations, every wheel that is both a leader and a follower, may be entirely omitted.

The power of a machine is not at all altered by the size of the wheels, provided the proportions to each other are the same.

On the application of men and horses, as moving powers in machinery, &c. A horse draws with the greatest advantage, when the line of draught is not level with his breast, but inclines upwards making a small angle with the horizontal plane.

A horse drawing a weight over a single pulley, can draw 200 lb. for eight hours a day, and walking at the rate of 2½ miles in an hour, which is about 3⅔ feet in a second, The worst way of applying the force of a horse is to make him carry or draw up hill: for, if the hill be steep, three men will do more than a horse.

As a horse, from the structure of his body, can exert most strength in drawing almost horizontally in a straight line, a man exerts the least strength that way.

A man turning a horizontal windlass by a handle, or winch, should not have above 30lb. weight acting against him, if he is to work ten hours a day, and raise the weight at the rate of three feet and a half in a second. This supposes, however, that the semidiameter of the windlass is equal to the distance from the centre to the elbow of the handle; for if there is a mechanical advantage, as there usually is, by having the diameter of the axle, on which the rope winds, four or five times less than the diameter of the circle described by the hand, then may the weight (taking in also the resistance, on account of the friction and stiffness of the rope) be four or five times greater than 30lb., that is, so much as it rises slower than the hand moves.

MECONIUM, in pharmacy, the extract of English poppies. Meconium has all the virtues of the foreign opium, but in a somewhat lower degree.

MEDAL denotes a piece of metal in the form of coin, such as was either current money among the ancients, or struck on any particular occasion to preserve the portrait of some great person, or the memory of some illustrious action, to posterity. As historical documents, they form the principal evidence we can have of the truth of the old historians. In some few instances they correct the names of sovereigns; and in a great many, illustrate the chronology of reigns. By their assistance the geographer has sometimes been enabled to determine the situation of a town whose

vital functions.
itio; asthma; dyspnæa;

e natural functions.
ia; colca; cholera; di-
s; hysteria; hydropho-

saniæ. Derangement of
endently of pyrexia or

tia; melancholia; mania;

nexiæ. A depraved ha-
ut idiopathic pyrexia or

ores. A wasting of the

s; atrophia.
mescentiæ. A swelling
of the greatest part of the

sæ. Fatty swellings.
rcia.
losæ. Windy swellings.
umatosis; tympanites;

pes. Watery swellings.
rocephalus; hydrorachi-
; ascites; hydrometra;
onia.
npetigines. Cachexies,
; the skin and external

hula; syphilis; scorbutus,
pra; trambæsia; tricho-

Order I. Febris.

iena of fever.—The per-
th languor or sense of de-
ness in motion, and some
erting it, with frequent
tching. At the same time
xtremities become pale,
ik, the bulk of every ex-
iminished, and the skin
ody appears constricted
en applied to it. At the
ie symptoms, some cold-
nities, though little taken
atient, may be perceived
n. At length the patient
nsation of cold commonly
k, but passing over his
id now his skin feels
r person. The patient's
reasing, produces a tre-
mbs, with frequent suc-
in the trunk of the body.
of cold and its effects
r some time, they become
are alternated with warm
egrees the cold goes off
heat greater than natural
ntinues over the whole
s heat, the colour of the
nd a preternatural red-
especially in the face.
nd redness come on, the
nd smooth, but for some
ry. The features of the
arts of the body, recover
and become even more
heat, redness, and tur-
ncreased and continued
moisture appears on the
degrees becomes a sweat
extends downwards over the whole body. As this sweat continues to flow, the heat of the body abates; the sweat after continuing for some time, gradually ceases, the body returns to its usual temperature, and most of the functions are restored to their ordinary state.

This order is divided into two sections, an intermittent, including tertians, quartans, and quotidians, with the different varieties of these distinct genera; and continued, which include the genera of synocha, or simple inflammatory fever; typhus, putrid, or gaol-fever; and synochus, a mixed fever commencing like the first, and terminating like the second. The intermittent family are divided as follows: Fevers arising from the miasm of marshy grounds with an evident remission, the returning fits being almost always ushered in by horror or trembling. One paroxysm only in the day. The continued family are defined thus: fevers without intermission, not occasioned by marsh miasm, attended with exacerbations and remissions, though not very perceptible.

The genera of continued [illegible], are

1. Synocha. Great heat: pulse frequent, strong, and hard; high-coloured urine; the functions of the sensorium not much impaired.

2. Typhus. A contagious disease, the heat not much increased; pulse frequent, small, and weak; urine little changed, sense much impaired, and the strength greatly diminished.

3. Synochus. This is made by Cullen a kind of intermediate disease between synocha and typhus.

Exciting causes of fever.—On this subject the most opposite opinions prevail. It is imagined by some, that no case of genuine fever, beyond those ephemeral irritations which are of daily occurrence, can possibly originate without the previous application, either through the medium of the lungs, or the surface of the body, of a certain something generated in the system of another individual in the course of the same disease. Others infer, from the daily observation of febrile diseases, where no communication with the sick can be traced or suspected, that although the febrifacient matter just spoken of be in many, it is not in all instances the cause of fever; that cold, damp, heat, putrid exhalations whether animal or vegetable, insufficient ventilation, the depressing passions, &c. are all, either singly or in conjunction, capable, under some circumstances, not merely of predisposing to, but of actually engendering proper fever. Lastly, there are some who consider contagion, or the generation in fever of specific febrifacient matter as totally imaginary: and conceive instances where fever has spread by communication, that either certain undetected conditions in the air, or the confined effluvia of animal excretions accumulated by want of cleanliness and ventilation, with other circumstances, are causes sufficiently adequate to produce the affection, without supposing the agency of a specific and occult power.

In the treatment of fever we must endeavour to diminish the cold in the cold stage, the heat in the hot stage, and not await the sanative process of nature, either of dissolving spasm, or of correcting and expelling morbific matter. The various remedies employed for these purposes are, the external and internal use of cold and warm water; refrigerants, sudorifics, opiates, emetics, purgatives.

"The safest and most advantageous time," says Dr. Currie, "for using the cold water is, when the exacerbation is at its height, or immediately after its declination has begun; and this has led me almost always to direct it to be employed from six to nine in the evening; but it may be safely used at any time of the day, when there is no sense of chilliness present, when the heat of the surface is steadily above what is natural, and when there is no general or profuse perspiration.

"Under these restrictions," our author adds, "the cold affusion may be used at any period of fever; but its effects are more salutary in proportion as it is used early. When employed in the advanced stages of fever, where the heat is reduced and the debility great, some cordial should be given immediately after, and the best is warm wine."

From the urgency, however, of the debility, or from the prejudices of the patient or his friends, in some periods of fever, the application of cold water in the way of ablution may be regarded as too severe. In this case tepid ablution has been made to supply its place, and often with propriety and success. The term tepid is applied by Dr. Currie to water, from 87 deg. to 97 deg. of Fahrenheit; from 87 deg. to 75 deg. the water is denominated cool. Cold water may be given internally, and with the utmost freedom, in the hot stage of the febrile paroxysm, if the heat of the surface be steadily above the natural standard. Draughts of cold water have been known, when properly administered, to procure a sudden solution of the disease.

The extraordinary melioration in the modern practice of medicine, as it relates to the treatment of fever and febrile diseases, is not confined to the copious use of affusion and ablution. The terrors of our predecessors, in relation likewise to cold air, are fast departing; and the importance of its free admission in the apartments of the febrile sufferer especially, comes to be generally acknowledged and applied.

The admission of it however requires likewise to be restricted to the hot stage, and to be limited by the patient's feelings; a current of cold air passing rapidly over the body while in a state of perspiration, may be productive of fatal consequences.

Besides, however, the employment of cold water, and the free admission of a cool and pure atmosphere, other agents have been had recourse to, and with considerable effect, in order to abate the inordinate heat of fever. From possessing the faculty of cooling the system, certain medicines have been distinguished by the term refrigerants; they are principally chosen from the vegetable acids, and the different neutral salts.

We now proceed to consider the agency of sudorifics as febrifuge remedies. Moisture on the surface of the body may be procured by medicines which appear to have a direct power over the cutaneous vessels, or by those whose action seems to be directed primarily to the stomach. These last are principally of the saline class, which are by far the most suitable in the ferbile state.

Nothing, perhaps, is of greater moment in almost every stage and every kind of fever, than to preserve the whole of the alimentary canal free from accumulation of colluvies, &c.

In the primary stages of fever, an emetic has been known abruptly to arrest its progress, and the same purpose is sometimes accomplished, especially in epidemical affections of the febrile kind, by the employment of a brisk *purgative*. In the more advanced periods however of the disorder, the object of the physician ought to be rather that of keeping the bowels gently open, and this is best effected by [illegible] place of drastic purgatives (the former of which principally operate by exciting the exhalants on the internal surface of the intestines to pour out their contents, the latter by stimulating in a forcible manner the intestinal fibre.

In intermittent fevers it is generally necessary to evacuate the bowels by more stimulant cathartics, more especially when the cure of these fevers is conducted by the Peruvian bark.

If during fever, indicating in its primary stages no particular severity of disease, a rapid change take place in the features and expressions of the invalid, if upon the more ordinary symptoms suddenly and unexpectedly supervene delirium, prostration of strength, an [illegible] change in the countenance, accompanied by irregular and partial alternations of heat and cold, without the intervention of the perspiring state, the patient's life is in considerable danger. The above changes are often indeed preludes to a speedy death.

Weakness, quickness, and irregularity of pulse, delirium, tendency to fainting when in an erect posture, prostration of strength, partial and irregular sweats, difficult respiration and deglutition, startings of the tendons, unusual fetor in the evacuations, great foulness of the tongue and fauces, are all evidences of a fatal tendency in the complaint; in general likewise it may be observed, that in cases where much great nervous irritation attend the onset of a fever, even though the disorder may not assume what has erroneously been called the putrid type, much danger is to be apprehended. After the second week the seventeenth and twentieth are the most usual days of termination. These, however, are by no means unexceptionable rules.

Recapitulation of the treatment of fever.

Treatment of continued fever during the first three or four days. Cold affusion. Water to be impregnated with salt, its application to be confined to the hot stage of the paroxysm. Large draughts of cold water taken under the same limitation. Cold and pure air. Emetics. Purgatives. Antimonial and saline sudorifics.

After the fifth or sixth day. Cold and tepid ablution. Water employed to be impregnated with salt or mixed with vinegar. In the urgency of debility, cordials,

iluvium or the warm bath.
ept gently but constantly
or mild purgatives and
While the skin is preser-
iaphoretics, give opiates
last are almost invariably
the skin is dry and hot,
costive. For head-ache
us affections, blisters, &-
In the last stages, when
eak out, and the powers
be shrinking from the con-
isses of port wine with
am in large quantities.
e course of the disease the
diligently preserved cool,
ventilated, and free from
it those who are necessary
sick.
itermittent fever. Cold
itely upon the full acces-
. Warm bath, warm spi-
g the cold stage of the
ture of opium, either pre-
ession of the cold, or to-
e of the hot fit. Emetics,
ceding the accession of
alomel purges before the
tonics; arsenic, zinc,
assia, and if any enlarge-
e viscera (ague cake) ap-
pe: upon the excitation
er of charms altogether
sometimes succeed in
remedies are counteract-
e of the complaint.

egmasiæ, Inflammations.
of the body has an unu-
dness, with pain and
to be inflamed. To con-
e a part, an inordinate
on of vessels have gene-
ned sufficient.
enic inflammation. The
system does not corres-
he magnitude of the lo-
n with the constitutional
individual affected Of
re the subjects of inflam-
p. evious y have possess-
tional vigour, the other
languid and feeble—the
a sthenic, the latter an

inflammation. Inflam-
to be resolved when
and action of parts
without disorganization.
inflammation has exist-
or has been violent, an
on takes place from the
, which is called pus;
d or confined constitutes
n the inflammation ends
is said to terminate by
ases of much weakness,
iduced, the vascular ac-
all cease altogether, as
recoverably exhausted.
the consequence, which
rm sphacelus, or mor-
lammation of the lungs
by a copious effusion of
nto the cellular texture
nd an inflammation of
us, or hardness of the

Species of inflammation. This disorder is systematically divided into two leading species—phlegmonous and erythematic. The first is defined by Dr. Cullen, "an inflammation of a bright-red colour, with a circumscribed pointed tumour, and tending towards suppuration." The erythema has a less vivid colour, with scarcely any tumour, spreading irregularly, burning rather than throbbing pain, and terminating in vesicles.

Indications of the disorder's decline. A cessation of pain, a reduction of tumour, a loss of redness and heat, a diminution of the systematic disturbance, are all evidences that the inflammation is about to terminate. If, however, it be suffered to run on into the stage of suppuration, the indications of this state are, the pulse becoming fuller and softer, the patient being attacked with shiverings, and a pulsatory feel in the affected part. A tendency to gangrene is denoted by the tumour losing of its redness, and assuming a darker hue; by the sudden cessation of pain; sometimes by blisters arising near or upon the tumour, and lastly, if the local disorder have been considerable, by a rapid declension of pulse, or powers of life.

Treatment. The indications of cure are to be deduced from the sthenic or asthenic disposition of the disease, and from the peculiar nature of the part or organ injured.

If inflammation be attended by a full, hard, and vigorous pulse, with other expressions of power, a debilitating plan of treatment is to be adopted; blood is to be drawn from the arm, saline purgatives are to be administered, cold is to be applied, and the exciting powers as much as possible withdrawn. If, on the contrary, an equal degree of local affection shall be accompanied with feeble, although quick, pulse, and the remaining symptoms of debility, an opposite plan, under certain regulations and exceptions, is to be pursued; stimulants are to be thrown in, and the inflammation cured by impelling and supporting the torpid and feeble powers of the frame. But from the peculiar nature of the part or organ affected, the mode of treatment in the same degree and kind of inflammation will likewise be materially modified. Thus an asthenic affection of the liver requires different stimuli from an asthenic affection of the stomach.

But although in inflammation, as in fever, we generally recommend the cool treatment and consequent free admission of air, it is to be recollected that this principle is objectionable in some kinds of inflammations, as of the lungs. For example, in small pox and in measles, we shall have the same degree of pyrexia, or fever, present; and cold air would be equally indicated in either, were we to infer the proper method of treatment alone from the inflammatory excitement; but in measles the lungs are often the principal seat of the local affection, an oxygenous or pure atmosphere would prove too stimulating to these organs: and thus if we pursued general doctrines without particular exceptions, or overlooked "the peculiar nature of the part or organ injured," the object of our plans would be frustrated and defeated.

Genus III.—Cynanche, quinsy.

Species 1st. Cynanche tonsillaris, common inflammatory sore throat.

M. M. Acid gargles. Saline purgatives. Blisters. Antimonial diaphoretics.

Species 2d. Cynanche maligna. An accidental but very common symptom of scarlet fever. See *Scarlatina*.

Species 3d. Cynanche trachealis, croup.

Species 4th. Cynanche pharyngea, a mere extension into the pharynx of the cynanche tonsillaris.

Species 5th. Cynanche parotidæa. The mumps is an affection of the parotid and maxillary glands, which appears in the form of a swelling under the jaws. It sometimes appears as an epidemic

M. M. If delirium supervene upon the retrocession of the swellings, blisters. "Foment the head with warm water." Darwin.

Genus IV.—Pneumonia, inflammation of the lungs.

Genus V.—Carditis, inflammation of the heart or pericardium.

Genus VI.—Peritonitis, inflammation of the peritoneum.

The general symptoms are, pyrexia, pain in the chest, difficulty of breathing, cough; and, if the disorder happen in the sthenic diathesis, the pulse is hard and frequent. Sometimes the expectoration is tinged with blood.

The particular symptoms are, in carditis, palpitation, with unequal intermitting pulse, pain in the region of the heart, vomiting, fainting; if the inflammation be particularly directed to the diaphragm, the pain is situated towards the lower ribs, the respiration in a recumbent posture is extremely difficult, and the corners of the mouth are sometimes so retracted as to form a disagreeable smile, called risus sardonicus.

M. M. If the constitution is sthenic, and the disorder urgent, immediate and co-

quica, sometimes
Causes.—The sam
wise strangulated he
lic, intro-su-ception.
M. M. The same
urgent symptoms h
doses of calomel and
Genus IX.—Hepa
the liver.
Symptoms.—Pain
liver, extending to
the right shoulder;
the left side especi
coloured urine; p
and often hard. Bil
jaundice. The ten
to suppuration.
M. M. Copious
before the supparat
menced. Calomel,
refrigerant class.
rable doses. Bliste
liver.
If suppuration tak
makes its way thr
intestinal canal, int
dodena, or through
surface. During th
bark.
A species of chr
usual in Britain, es
drinkers.
Symptoms.—Obt
of sensation in the
ficulty of lying on
the right shoulde
slightly marked by
spirits. Œdema o
M. M. Small do
or without opium.
quassia or gentian.
spirituous liquors.
Genus X.—Sple
the spleen.
Symptoms.—Ten
the left side: nau

d tumour above the
charging urine ; te-

tion. Warm bath.
Diluents.
steritis. Inflamma-

, and swelling in the
; vomiting.
ction. Mucilaginous
s. Anodyne fomen-

umatismus.
in the joints, fre-
along the muscles;
the part.
atism is sthenic, or
or chronic rheuma-
to the former.
the inflamed joints.
as after the inflam-
e measure subsided.
Sudorifics. Warm

chronic rheumatism.
um guaiacum. Flesh-
Electricity. Bath-

ontalgia, tooth-ache.

lagra, gout.
in the joints, princi-
, and especially of
eturning at intervals.
ession of the inflam-
of the stomach are
. The fits generally
ing.
arities.—Gout is in-
the asthenic diathe-
in a system predispo-
y the indirectly debi-
as a too liberal indul-
nd spirituous liquors,
s, &c. and likewise
tating powers of vege-
ood, depressing pas-
mation of this disease
h, and appears in a
, torpor in other parts
the brain producing
ach constituting dys-
er giving rise to jaun-
ptoms indeed may be
the disease. On this
een divided into the
e a disposition to the
foot is observable,
take place ; the re-
fter the continuance
uch inflammation, it
nsferred to another
a gouty inflamma-
h, or other organs ;
placed, in which the
tead of displaying it-
re, falls upon some
lungs, the stomach,

gout it should never
in asthenic disease :
kept up in the system
uspended. The irre-
out must be combat-
fully adapted to the
spasmodic affections
atics and bitters, as
It the head is affected

camphor, musk, ether, opium : these likewise are remedies for the gouty asthma. The Portland powder, which is a composition of bitters and aromatics, may prove for a time highly useful. Regular and steady, and not capricious and merely temporary, abstinence from wine, spirits, and spices. The body to be preserved gently open. Pure air, moderate exercise, encouragement of cheerful habits. Warm and cold sea-bathing. Bath waters. Very small doses of digitalis.

Order III.—Exanthema, Eruptions.

The exanthemata are more nearly allied to genuine fever than those disorders of which we have just been treating, as the local affections are consequences rather than causes of the general irritation. They have been called eruptive fevers. They are defined by Cullen contagious diseases, affecting a person only once during the whole of life, commencing with fever, and succeeded by eruption on the skin.

Genus I. Erysipelas; St. Anthony's fire.

Symptoms. This disease has frequently been found to recur. After febrile irritation has commenced, and continued for a short time, during which there is often an unusual drowsiness, and sometimes delirium, the face suddenly becomes bloated, the eyelids swell, and the skin is red and blistered. If the disorder is violent, or ill-treated, the inflammation and redness extend down the neck, and spread sometimes on the shoulders ; the tumid appearance of the countenance increases, delirium supervenes, and the patient has been known to die apoplectic. The erysipelas is an erythematic inflammation. Its seat is the rete mucosum. Its tendency is to gangrene rather than to suppuration. A fatal termination is said to be principally on the 7th, 9th, or 11th days.

M. M. In no other affection is it of more urgent moment to decide on the treatment by the nature of the prevailing diathesis. It has been observed, that in large and populous cities St. Anthony's fire almost always appears in the form of asthenia, and in this case requires wine, bark, opium ; while in the hardy constitution of the rustic it assumes a sthenic character, and demands the vigorous employment of what has been called the antiphlogistic regimen. Venesection. Saline purgatives. Diluent drinks. With respect to external application, it has been customary to use mealy substances, such as flour.

Genus II. Pestis, the plague, is an epidemic typhoid fever.

Genus III. Variola, small-pox.

Symptoms. After the pyrexial symptoms have continued for three days, eruptions appear on the skin, which on the eighth day contain pus, and at length fall off in crusts.

Species. The small pox is divided into the distinct, and confluent: the first has more of the sthenic, the latter of the asthenic, character. In the former the eruptions are of a phlegmonic, in the latter of an erythematic or spreading, nature. The eruption of the distinct small-pox makes its appearance in circumscribed red spots inoculation. The advantages of inoculation for the small-pox need not be insisted on. The only cautions requisite in preparing for inoculation, are to preserve the bowels free from sordes, and to choose a time for the insertion of the matter when teething, or other irritative processes, are not going on in the system. Inoculation ought to be performed either before the second month, or after the second year.

M. M. Cold air. The bowels to be preserved open. Animal food to be denied. If the fever runs high, antimonials and nitre. In the confluent species, the alimentary and intestinal canal to be preserved free from congestions by purgatives, and the powers of the system supported by opium, bark, small doses of nitre, wine, pure air; vinegar aspersed about the bed, walls, and floor of the apartment. Pediluvium. See *Vaccination.*

Genus IV. Varicella. The chicken-pox is a very slight disease; the eruptions sometimes assume nearly the character of the distinct small-pox; they generally disappear in the course of three or four days from their first breaking out.

Genus V. Rubeola. Measles.

Symptoms. Pyrexia, sneezing, inflamed eyes, dry cough, drowsiness; about the fourth day, or later, small red points appear on the skin, which in the course of about three days fall off in branny scales.

M. M. Measles too often lay the foundation of pulmonary consumption, to prevent which the symptoms denoting inflammation of the lungs are to be with much solicitude obviated; and for this purpose small doses of tincture of digitalis are to be preferred to every other medicine. Steady and cool atmosphere, not cold air in currents. Refrigerant cathartics with calomel. Animal food not to be given. Digitalis, with a very small

or four days subside.
to be regulated by the
dant fever.
Genus X. Aphtha,

Order IV.—Hemo
of bl
Genus I.—Epistaxi
nose.
Symptoms.—Pain o
giddiness, dimness of
irritation of the nostr
M. M. Cold applie
head. Mechanical p
substances to the no
tringents internally.
the body or mind. T
gently open. Nouris
lating aliment. In
people, and in cases
bark, vitriolic acid, o
der is violent, and
the suppression of so
such discharge to be
Genus II.—Hemo
blood. Symptoms. R
a sensation of weigh
cult respiration. Sti
irritation in the trac
florid blood.
Causes.—Violent
body, sudden vicissit
too powerful exertio
singing, coughing, pl
struments.
M. M. All irritati
to be carefully guard
be kept evacuated
Manna, Tamarinds.
combined with mine
the sulphuric. Opiu
doses, so as to occasio
spoonful of common
turn of the obstructe
Phthisis pulmonali
lungs.

Consumption, however, may be
ght on by amenorrhœa, lues vene-
nreasonably repelled eruptive action
e surface, mental affections, &c.

M. In no case, perhaps, is neglect
rly mismanagement of disease more
ant with irremediable evils, than in
nstance of consumptive affections.
lis properly and timely had recourse
"the anchor of hope." Warm bath-
A regular temperature in the air
e person breathes. Warm clothing.
ding currents of air. Assiduously
ding against damp, and especially
pplication to the feet. Milk diet.
ring all spirituous liquors, and spiced
gh-seasoned meats. Keeping the
s gently open by manna, castor-oil,
, &c.

n the lungs have actually become
ted, very little expectation of reco-
can remain. Griffith's mixture,
osed of steel, myrrh, and alkali. Di-
in larger doses, and combined with
ove tonic. Opium and vitriolic acid.
lis combined with calomel. Change
ate. Sailing so as to occasion sea-
ss. Swinging, riding in a carriage,
her modes of occasioning a degree of
mous affection, and consequent nau
In the confirmed stages of phthisis,
diet which is nutritive, without
stimulant, ought to be advised.

us III. Hæmorrhois, the piles.
ght and pain of the head, . vertigo,
f the anus and loins, swellings and
blood from the anus.

M. If symptoms of arterial activity
pany the hæmorrhoids, vitriolic acid
moderate astringents, such as infu-
f roses. Temperance, exercise, ab-
e from spirituous liquors and spi-
Tamarinds. Lenitive electuary,
r, chrystals of tartar. Castor oil.
fomentation, by sitting over the
of heated water. Leeches.

n the hæmorrhoidal flux is attended
much debility, while the bowels are
pen by castor-oil and other similar
ves, the more powerful astringents
be employed. Steel. Exercise.
ous diet. Cheerful train of think-

us IV. Menorrhagia, immoderate
rual flux.

ptoms. Pain in the back and loins,
, difficulty of breathing, flushes of
nd cold, frequent pulse; in cases
the disease is more directly from
y, loss of appetite, paleness of coun-
e, coldness of the limbs, œdematous
ngs about the ancles.

M. In the first species, arising from
us affections, or violent passions
stimuli of all kinds, mental or physi-
Refrigerant cathartics, if costiveness
esent. Moderate astringents, such
sion of roses, and the sulphuric acid.
menorrhagia of direct debility, as-
nts, cordials, and stimulants. Peru-
bark and sulphuric acid, opium,
port wine. External application of
ater, or vinegar. Steel.

Order V. Profluvia.

us I. Catarrhus, a cold.

ptoms. Pyrexia, with increased
rge from the mucous membrane of
the nostrils, and in violent cases of the fauces and bronchiæ, with cough.

M. M. Moderate and equal temperature. The bowels to be kept gently open. If the febrile irritation is considerable, sudorifics. Antimonials, nitre. Oleaginous substances may be used to allay the cough. Liquorice, honey, boiled fig, almond emulsion.

If the phthisical tendency is conspicuous, digitalis.

Genus II. Dysenteria, dysentery.

Symptoms. Frequent stools, mixed with mucus, and sometimes with blood, attended with griping and tenesmus, the proper alvine excretions being retained; pyrexia, pulse quick and feeble The disease is sometimes contagious and epidemic.

Causes. Dysentery depends upon the irritability of weakness, determined by particular circumstances to the alimentary canal; its predisposing and exciting causes are alternations of heat and cold, more especially when accompanied by damp, the putrid miasma arising from the marshes; the contagious effluvia proceeding from the discharge in the disease; and from dead bodies left unburied.

The immediate cause of the symptoms seems to be, a spasmodic construction of the larger intestines, retaining the fæces.

M. M. Calomel, opium, and rhubarb, to relieve the spasm, and discharge the contents of the bowels. Mucilaginous clysters, as of starch with tincture of opium. Emetics. Small doses frequently repeated of ipecacuan. Colombo. Peruvian bark. Warm bathing.

Class II. Neuroses, Nervous diseases, or affections of either sense or motion, without idiopathic pyrexia, or visible disease of parts.

1. Comata. A diminution of voluntary motion, with sleep or impaired senses.

2. Adynamiæ, a diminution of the involuntary motions of either natural or vital functions.

3. Spasmi, morbid motions of muscular fibre.

4. Vesaniæ, disorders of the judgment or intellect, without primary pyrexia, or observable affection of any particular part of the body.

Order I. Comata.

Genus I. Apoplexia, apoplexy.

Symptoms. Abolition of the sentient and loco-motive faculties, the sleep in general attended with snoring. The respiration, motion of the heart, and other involuntary actions, remaining.

There is some degree of pressure on the brain in almost all cases of apoplectic stupor.

Apoplexy may be divided into sthenic and asthenic. If a vigorous and plethoric man, sitting down to his dinner and his glass, suddenly during the excitement of conviviality, of mirth, and of alcohol, fall on the floor with deprivation of sense and apoplectic stertor, it must be evident that the fit has been induced by a greater flow of arterial blood into the vessels of the brain, than the veins of this organ could, in due time, convey away. The apoplexy has been induced in the manner of a sthenic disease.

MEDICINE

[illegible] bed and [illegible] ligature about the patient's body, especially about the neck, to be loosened. Press hard with the thumb and fore finger upon the carotid arteries, taking care to avoid the jugular veins. Place the head of the patient high on his pillow, or seat him erect in a chair, preserve the apartment cool. Cold water may in some cases be applied vigorously to the forehead and temples. Afterwards strong purges, and antacid drinks. Enemas. Careful preservation from irregular and violent excitations, either of body or mind. In the asthenic form of the complaint, bleeding with much less freedom and only during the paroxysm. It is better to open the temporal artery, if convenient. The application of cupping-glasses still preferable;

Fainting may arise from [illegible] blood, [illegible] worms, or other [illegible] &c.

M. M. [illegible]

Genus II.—[illegible]

Symptoms.—[illegible] dent position, oppressed breathing, costiveness.

It acknowledges the same sources as other affections of weakness: these are intemperate use of spirituous liquors, and of tea; exposure to damp and cold; irregular hours of repose; intense study; mental depression and anxiety.

M. M. Purgatives with calomel, previously to giving tonics. An emetic. Columbo, gentian, quassia. Magnesia to ease the consequent pain of heartburn. Exercise on horse back. Cold or shower bath in very warm, and warm bathing in cold weather. A glass of warm water after dinner and supper.

Genus III.—Hypochondriasis, low spirits.

pasmi, Spasms.
c affections in the ani-

s. A spasmodic ri-
of the body: in some
violently backward,
and in both cases the
followed or attended
w.
exciting causes of te-
r pricks of tendons;
on of cold after ex-
temperance, or other
ay likewise be con-
l mucus, worms, and
tances, in the alimen-

quantities of cold wa-
ring the spasm. In or-
the catenated motions
ituted. Warm bathing.
ties of opium. Other
licines. Mercury. If
ated from a lacerated
n, divide it freely, and
nflammation.
ulsio, convulsions.
nic contraction of the
leep; idiopathic and
Infancy.
ea, St. Vitus's dance.
vulsive agitations of
al almost confined to
y. When the patient
e produces involun-

thartics with calomel;
k, steel, and other to-
galvanism, tepid ba-

ania, contractions in

stic contractions of
xcruciating pain, and
s, returning periodical-
g for many days. It
cies of rheumatism.
llowed by tonics; mer-
h opium.
psia, epilepsy. Violent
muscles, attended with

tic fits be congenital,
pend upon some occult
s system, the disorders
able. All that can be
rely to ascertain, and
ible, to obviate the ex-
disease; and during
loosen every bandage
d head, preserve the
as possible, and be care-
nt do not inflict injury
e violence of his agita-

tion is to be given to the
xciting cause or causes,
temperance, indulgence
ental passions and affec-
other epileptics, lively
evious impressions, re-
r discharges, sudden al-
xtremes of temperature,
s, and worms. These
ecessarily be removed.
s, with calomel; anthel-
y dissever the chain of
plunging the patient in

the cold bath, or dashing with violence cold water over his naked body.

Of Worms and Anthelmintics.—Intestinal worms are of three kinds: the ascaridis, or small thread-like worm; the lumbricusteres, or round worm; and the tænia, or tape worm. The first of these are principally confined to the rectum. The symptoms by which the presence of these may be suspected, are an uneasiness and itching in the rectum, especially urgent towards evening; this, if violent, disturbs sleep, and occasions febrile irritation, and sometimes tenesmus, with mucous discharge from the anus, indigestion, and itching of the nostrils.

M. M. Clysters of lime-water, injection of tobacco-smoke. Mercurial ointment introduced into the anus. Aloes and steel, both by the mouth and in the form of enema. Saline purgatives. Harrowgate water, so as to induce six or seven stools every morning.

The lumbricus is the most common. Lumbrici are of very different lengths and magnitude; they are principally found in the smaller intestines, but are situated occasionally both in the stomach and larger intestines. These worms have been known to pierce through the coats of the alimentary canal, and have thus occasioned most excruciating pains and death.

The tapeworms are sometimes voided of an enormous length: they have been stated to be from two to forty feet long. They properly consist of an united chain of separate animals; as, when broken, each portion has the power of reproduction. The symptoms are much the same with those of the lumbrici, but more urgent.

M. M. See *Materia Medica*, section Anthelmintics.

Spasmodic Affections continued.

Sect. II.—In the vital functions.

Genus I.—Palpitatio, palpitation. See Syncope.

Genus II.—Asthma.

Symptoms.—Difficult respiration returning at intervals, with a sense of tightness across the breast. Wheezing at the commencement of the asthmatic fit; scarcely any cough but what is hard; towards the close of the paroxysm it however becomes more free, attended with a discharge of mucus.

The causes of asthma are numerous, while its predisposition is often hereditary and dependant upon a peculiar conformation and temperament; the actual disease may be excited by intemperance either in eating or drinking, violent exercise, mental agitation, eruptions or discharges abruptly or unseasonably repelled; the fumes of metallic poison, as of lead, &c.

M. M. Spasmodic asthma, when fully established, scarcely admits of radical cure. The paroxysms to be relieved by opium and æther; coffee; tonics in the intervals, principally of the class of bitters and aromatics. Avoid distending the stomach inordinately. Emetics; enemas previous to the expected accession; gentle horse exercise; pure air; oxygen gas. If eruptions have been repelled, endeavour to restore them.

tery fluid with or without heartburn; the fluid brought from the stomach sometimes insipid.

M. M. Inhalation of tobacco smoke. A grain of opium twice a day, soap, iron powder, a blister.

Genus II.—Colica, colic.

Symptoms.--Permanent and excruciating pain in the belly, with a sensation as of twisting about the navel, constipation, and sometimes vomiting.

Causes.—These symptoms may be occasioned by indigestible food, the sudden application of cold, acrid substances, poisons, especially lead; hence colic is a kind of epidemic disease among painters, attended with paralysis of the arms, &c.

M. M. Opium. Cathartics, principally of castor oil. Warm bathing. Anodyne clysters. Fomentations and blisters to the part. In obstinate cases of the painters' colic, Bath waters. Carefully obviate the exciting causes of the disease.

Genus III.—Cholera.

Symptoms.—Vomiting and purging of bilious matter, violent pains in the stomach and bowels, with great anxiety and irritability.

Cholera is one of the diseases of the autumnal months; it is very often produced by the sudden succession of cold to unusually warm weather; it sometimes follows the taking of indigestible substances, as of much cold cucumber.

M. M. During the violence of the vomiting, and purging, give water-gruel, and inject starch clysters, to each of which add tincture of opium. After the disorder has in some measure subsided, restore due excitement by cordial and nourishing diet, with stomachic medicines. If febrile irritation is induced, the saline draught, composed of salt of wormwood and lemon juice.

Genus IV.—Diarrhœa.

followed by a sensati
ing to the throat, and
tion. Convulsive a
laughing and crying,
and irritability of mi
tity of straw-coloured
Hysteria generally fir
about the time of pub
tom of a lax habit,
upon the irritability o
be brought on by me
irritations in the stom
organs, &c.

M. M. Avoid ev
exciting cause of t
quassia, and other to
present symptoms, c
castor, opium; if this
crasy, disagrees with
oscyamus will gener
cellent substitute. E

Genus VII.—Hydro

A dread of water
convulsions of the p
the most part by the
violent spasms, furio

M. M. The part b
out. Dr. Thornton a
tion of hot vinegar, sh
olic acid, to the woun
had been bitten by a
this application was
ing success. Mercury
extolled as a specific

Order IV.—

Disorders of the in
of pyrexia or coma.

Genus I.—Amentia

Amentia is defined
judgment, preventing
the recollection of the
There are 3 species:
age; from intemperan
ternal causes. When
little hopes of recov

rwn. In incipient and
ss, cautiously abstain
uspicious in the hearing
thing is more calculated
o mad than the idea of
On this account pre-
ent is to be deprecated.
laced over the insane as
ld unite decision and
cter with tenderness of
entleness of manners.
ore habits, venesection.
e last, especially in me-
quire to be of the dras-
ed with calomel. Diarr-
roves a natural cure of
s. Camphor. Opium in
l bathing during the vio-
roxysms, and in some
ng in the intervals. Dur-
of phrenzy, apply cold
l. Clay cap. Blisters to
ome cases the production
state by a rotatory swing,
ound effectual in break-
associations constituting
melancholy paroxysms.
large doses, but regulat-
ntroducing a new disease,
vial nature, and easy of

Oneirodynia, is divided
: the active, or that ex-
g and various other mo-
gravans, with a sense of
sure on the chest. This
ous of authors, or night-

e appears to arise from
of the circulation of blood
gs, from defective irrita-
gans, induced by fatigue,
ion, a full supper, and

perance; especially mo-
To sleep on a hard bed
raised. Emetics. Purga-
d calomel. Tonics. Sleep-
ry apartment, and without
ed.
Cachexiæ. Cachexies.

er I. Macores.
the body or general ema-

bes. Asthenia, emaciation

Atrophia. Asthenia, and
hout hectic.
ophia, a supply of nourish-
ent to the loss that may
ained; if emaciation has
ntal disturbance, the reme-
ly be made to apply to the
from the vegetable class,
bo, quassia, and gentian.
rile irritation, by keeping
lly open by the milder pur-
manna, senna, and cas-
ve a slight moisture of the
ses of antimonials. Regu-
te, not violent or agitating
wer-bath in very warm,
in cold weather. Pure

maciation, accompanied by
An emetic, to accomplish
pose of forcibly expelling,

ventricular and intestinal acidities, and exciting the languid absorbents. Drastic purgatives, as jalap or aloes, with calomel with the same intention. Steel, in conjunction with Peruvian bark or bitters. Horse exercise. Warm bathing.

Order II. Intumescentiæ, general swellings.

Sect. I.—Adiposæ, Fatty swellings.

Genus I.—Polysarcia, obesity. This arises from the deposition of oil in the adipose membrane becoming disproportionate to the requisitions of the body.

M. M. Temperance, exercise, less animal food, early rising.

Sect II.—Flatulosæ, windy swellings.

Genus I.—Pneumatosis, a tense elastic swelling of the body, crepitating under the touch.

M. M. Scarifications, compresses, tonics.

Genus II.—Tympanites, a windy swelling of the abdomen, tense, elastic, painful, and attended by costiveness.

These swellings often take place in conjunction with anasarca, or other disorders of debility, and frequently arise from sedentary habits, hypochondriac ailments, and innutritious diet.

M. M. Carminatives, emetics, tonics, and a generous diet, with exercise.

Genus III.—Physometra, an elastic swelling in the hypogastrium, consequent upon flatulent distension of the womb.

This frequently deceives the barren female with the hopes of pregnancy, till nature explains the mystery, and her expectations vanish in air.

Sect. III.—Aquosæ, watery swellings.

Dropsical enlargement is distinguished from pneumatosis by its being inelastic, or pitting from the pressure of the finger, and slowly recovering its former fulness.

Dropsy is a collection of serous fluid, either in the cellular membrane, or in the cavities of the body. It is invariably occasioned by exhalation being disproportionate to absorption; this increase of exhalation and diminution of absorption result from debility, which may be either direct or indirect; the latter follows increased action of the vessels, as in the dropsy succeeding to intemperance; the former arises out of deficient excitement in the lymphatic system, as when an individual becomes dropsical from indolence, inactivity, mental depression, and poverty of diet.

Genus I.—Anasarca, General dropsy.

Dropsy of the cellular membrane immediately under the skin appears principally in the lower extremities, Anasarca, as it arises from exhausted excitability in the lymphatic vessels, is always a disorder indicating much danger.

M. M. Those stimuli which are found to exert their influence on the absorbent vessels, particularly steel, digitalis, calomel. Diuretics, such as squills, juniper, nitrous æther, cantharides, chrystals of tartar, and nitre. The physician must be especially careful while evacuating the fluid by means of diuretics, to support the general excitement, in order to prevent its reaccumulation.

The sparing use of liquids is generally

proper in dropsy; instances, however, have been known of copious draughts of water producing a termination of the complaint.

Genus II.—Hydrocephalus, dropsy of the brain. See *Infancy*.

Genus III.—Hydrorachitis, dropsical tumour in the spine. See *Surgery*.

Genus IV.—Hydrothorax, dropsy of the chest.

Symptoms.—Difficulty of breathing, especially in a horizontal position, paleness of countenance, starting in sleep, palpitation of the heart, numbness of the arms, especially when elevated, and in the advanced stages of the malady an evident fluctuation of water in the cavity of the chest.

Causes.—Where the universal has preceded the local affection, the malady is most frequently to be traced to intemperance in the use of fermented and spirituous liquors. The most usual source of genuine hydrothorax, or hydrops pectoris, is the sudden application of cold, while the body is in a state of perspiration and debility, from previous heat and exercise.

M. M. Digitalis in considerable doses is specially indicated in dropsy of the chest. Squill, in combination with calomel, for the hydrops pectoris; and if the cellular membrane be anasarcous, connect steel with both the above medicines. Chrystals of tartar, especially in the anasarca pulmonum. Diuretics of other kinds, the same as in general anasarca. Opium. In hydrothorax, or dropsy of the chest, without anasarca, paracentesis, or puncture in the side.

Genus V.—Ascites. Dropsy of the abdomen.

The swelling of the abdomen is tense, scarcely elastic, but fluctuating. Ascites is attended with scarcity of urine, thirst, and after some time a degree of hectic fever.

Ascites most usually originates through the medium of a diseased liver, and such disease is, in the greater number of instances, itself induced by intemperance in spirituous liquors.

If the water is independent of disease in the liver, chrystals of tartar, digitalis, other diuretics, and steel, may be immediately had recourse to, without the intervention of calomel, purgatives, and of emetics, which last are almost always indicated in the more usual form of ascites, that form a morbid affection of the biliary organs. Emetics in hepatic ascites often are attended with most beneficial effects. A combination of gamboge, elaterium, and calomel, is frequently employed as a purgative in ascites. Mercurial ointment to the region of the liver. Tonics, especially steel. The inhalation of vital air.

Genus V.—Hydrometria. Dropsy of the womb.

It is characterized by dropsical swelling confined to the region of the uterus. The unmarried and the barren are principally obnoxious to it.

M. M. Stimulant fomentations. Drastic purgatives. Aromatic fœtid gums. Emmenagogues.

Genus VII.—Hydrocele. Dropsy of the scrotum. See *Surgery*.

Sect. IV.—Solidæ. Swellings of solid parts.

Genus I.—Physconia. A swelling chiefly occupying a portion of the abdomen, increasing gradually, and neither tense and sonorous as in pneumatosis, nor fluctuating as in dropsy.

This disease is principally formed by a schirrous state of the several glandular viscera, which form its seat. These schirrous enlargements are generally incurable.

Genus II.—Rachitis. See *Infancy*.

Order III. Impetigines.

Deformities and discolorations of the external surface from general disease.

Genus I.—Scrophula. King's evil.

Swellings of the lymphatic glands, terminating in ulcer, are perhaps the only proper characteristics of actual scrophula.

A scrophulous habit is merely a susceptibility of disease, arising from torpor in the lymphatic vessels, and when brought by the agency of exciting causes, consists in a peculiar action of the lymphatic glands, by which inflammation and at length ulceration, with a discharge of grumous matter, are induced.

Its exciting causes are those which encourage the original debility, and the disease may almost certainly be averted by attention to diet and regimen: by nutritious food, a pure oxygenous atmosphere, cleanliness, exercise, &c.

When by neglect, the predisposition has been permitted to break out into disease, calomel purges, steel, small doses of digitalis, warm and sea-bathing, muriate and phosphates of barytes; above all, cleanliness; ventilation, stimulating nutritious diet. See *Surgery*.

Genus II.—Syphilis. Venereal disease.

After impure connection, a disorder of the genitals, ulcers in the mouth and gums. Eruptions on the skin of a copper colour, terminating in ulceration; these are principally situated near the margin of the hair; blotches on the surface of the body, especially on the surface of the face. Nocturnal pains in the centre of the bones.

M. M. Mercurials. Nitric acid. See *Surgery*.

Genus III.—Scorbutus, scurvy.

Indolence and lassitude; bloated and tumid countenance; gums livid, and disposed to bleed spontaneously, or from the slightest irritation; skin dry and covered with livid spots; œdematous swellings of the ancles. Scurvy appears to originate from want of, or exhausted, carbon, both in the venous and absorbent system; it is produced by a protracted use of salt food, and by mental depression.

M. M. Fresh animal and vegetable diet, juice of lemon. Bark. Steel. Temperate atmosphere. Mental excitement.

The elephantiasis, lepra, frambœsia, and trichoma, forming the fourth, fifth, sixth, and seventh genera of this order, are diseases of such rare occurrence in this country, as not to require any particular description.

For the more common eruptions which require local application, see *Surgery*.

Genus III. Icterus, jaundice.

wness of the skin and ly fæces; high-colour-ed urine yellow; languor, and depression of spi-

of the skin, which arises from the diffu-sion of that bile, which would pass through to the intestinal canal. f the biliary secretion spasmodic affection ronic inflammations the liver interfering from certain concre-te part of the hepatic stones, and, from vis-up or obstructing the

[illegible] species of jaun-a temporary nature. s upon a long course n spirituous liquors, medied by removing er itself.

[illegible] calculi, which species of jaundice, rom jaundice frequent eturning, from the ap-concretions among the disease being attend-as in the epigastric hypochondrium. Nau-sea, and sickness, of-[illegible] this species of

[illegible]

[illegible] of *Mate-ria medica*.

[illegible] or inquest [illegible] pleas, wherein the

[illegible] mean or middle [illegible] argument [illegible]

[illegible] medium.

[illegible] or *Arithmetical* [illegible] that which is [illegible] extreme, or which [illegible] reme as much as [illegible] greater, in respect [illegible] portion; [illegible] and 2.

[illegible] trical, is that where [illegible] served between the *last* and second, as between the second and third terms, or that which exceeds the same ratio, or quota of itself, as it is exceeded: thus 6 is a geometrical medium between 4 and 9.

MEDIUM, in philosophy, that space or region through which a body in motion passes to any point, thus æther is supposed to be the medium through which the heavenly bodies move.

MEDIUM, *subtle* or *Ætherial*. Sir Isaac Newton makes it probable, that besides the particular aerial medium, wherein we live and breathe, there is another more universal one, which he calls an ætherial medium, vastly more rare, subtile, elastic, and active than air, and by that means, freely permeating the pores and interstices of all other mediums, and diffusing itself through the whole creation; and by the intervention hereof, he thinks it is, that most of the great phenomena of nature are effected.

MEDULLA, or MARROW, See *Anatomy*.

MEDUSA, in natural history, a genus of the vermes mollusca class and order. Body gelatinous, orbicular, and generally flat underneath; mouth central beneath. There are forty-four species, divided into two sections, viz. A body with ciliate ribs. B. body smooth. They consist of a tender gelatinous mass of different figure, with arms proceeding from the lower surface: the larger species, when touched, cause a [illegible] tingling and redness, and are usually denominated sea-nettles; they are supposed to constitute the chief food of [illegible]. Most of them shine with [illegible] in the water.

[illegible] spe-cies [illegible] generally of a yel-low [illegible] massive, inter-nally [illegible] to the tongue, [illegible] 1.6. [illegible] earth [illegible] also as a medicine [illegible] earth.

ME[illegible]A, in botany, a genus [illegible] of the [illegible] class and order. Generic character [illegible] double; [illegible]

[illegible]

John's wort-leaved melaleuca, the most beautiful of the genus, and it is plentiful in the English gardens. It grows wild in swampy grounds, in New South Wales.

MELAMPODIUM, in botany, a genus of the syngenesia polygamia necessaria class and order. Nat. ord. compositæ discoideæ, calyx five-leaved, receptacle chaffy, conical; down, one-leafed; involuted converging. There are three species, annuals of South America and the West Indies.

MELAMPYRUM, in botany, *cow-wheat*, a genus of the didynamia angiospermia class and order. Nat. ord. personatæ. Calyx four-cleft; cor. upper lip compressed, with the edge folded back; caps. two celled, oblique, opening on one side; seeds two, gibbous. There are five species.

MELANITE, a species of the flint genus, of a velvet black colour, inclining to greyish black. It occurs in six-sided crystals, and in grains. Spec. gravity 3.7 to 3.8. One hundred parts contain of Silica, 35. Alumina, 6. Lime, 32. Oxide of iron, 25. Manganese, 2.

MELANTHIUM, in botany, a genus of the hexandria trigynia class and order. Nat. ord. of coronariæ junci. Cor. six-petalled; filaments from the elongated claws of the corolla. There are ten species.

MELASTOMA, in botany, a genus of the decandria monogynia class and order. Nat. ord. of calycanthemæ. Essential character: calyx five cleft, bell-shaped; petals five, inserted into the calyx; berry five-celled, wrapped up in the calyx. There are sixty-seven species, of which M. acinodendron is a large tree of South America. The fruit grows in loose spikes at the ends of the branches, of a violet colour.

MELEAGRIS, in natural history, the turkey, a genus of birds of the order gallinæ. Gen. char. bill convex, short and strong; head and neck covered with spongy caruncles; chin with a longitudinal membranaceous caruncle; tail broad and expansile. Gmelin notices two species, and Latham five. The meleagris gallipavo, or wild turkey, is a native of America, the presumed origin of every species under the genus. In the northern parts of that continent these birds are found in flocks of several hundreds, which during the day time, resort to the woods, feeding principally upon acorns, returning by night to some swampy grounds, where they roost upon the highest trees. In Carolina they occasionally grow to the weight of thirty pounds. Turkeys breed only once in a year, but will produce a great number at a time, sometimes seventeen. The female sits with extreme closeness, and is very assiduous in maternal duties. The young, however, are very susceptible of injury, from almost innumerable causes, from cold and wet, and even sunshine itself.

MELIA, in botany, bead-tree, a genus of the decandria monogynia class and order. Nat. ord. of trihilatæ. Cal. five toothed; petals five; nectary cylindric, bearing the anthers at its mouth; drupe with a five celled nucleus. There are three species, large trees, of the East Indies.

MELIANTHUS, in botany, *honey-flower*, a genus of the didynamia angiospermia class and order. Nat. ord. of corydales. Cal. four-leaved, petals five, with the nectary within the lowest; caps. five-celled. There are three species, natives of the Cape of Good Hope.

MELICA, in botany, melic grass, a genus of the triandria digynia class and order. Nat. ord. of gramina. Cal. two valved, two-flowered, with the rudiment of [illegible] rets that are abortive. There are [illegible]teen species.

MELLICOCCA, in botany, a genus of the octandria monogynia class and order. Nat. ord. sapindi. Cal. four-parted; petals four; stigma subpeltate; [illegible]. There is but one species, viz. M. [illegible], a middle sized tree with spreading branches; a native of South America. The fruit is mellow, and the size of a [illegible] plum.

MELICOPE, in botany, a genus of the octandria monogynia class and order. Cal. inferior, four-leaved; petals four; nectary glands four; caps. four, one-seeded. There is one species, viz. M. ternata, a native of New Zealand.

MELICYTUS, in botany, a genus of the dioecia pentandria class and order. Cal. five-toothed; corolla five-petalled; nectary five scales; male anthers five, without filaments, fastened to the [illegible] of the nectary: female stigma [illegible] out, four or five lobed; capsule [illegible], one celled; seeds nestling. There is one species, viz. M. ramiflorus, a native of New Zealand.

MELISSA, in botany, baum or balm, a genus of the didynamia gymnospermia class and order. Nat. ord. of [illegible]. Cal. dry, flattish above; upper lip [illegible]; cor. upper-lip somewhat arched, bifid; lower lip with the middle lobe heart-shaped. There are six species, of which M. officinalis, common garden balm, has a perennial root and an annual stalk. The flowers grow in loose small bunches from the axils, on short single peduncles of a white or yellowish colour.

MELITTIS, in botany, bastard balm, a genus of the didynamia gymnospermia class and order. Nat. ord. verticillatæ. Cal. wider than the tube of the corolla; cor. upper lip flat, lower crenate; anthers crosswise. There are two species, viz. M. melissophyllum, bastard balm, and M. japonica.

MELLATES, in chemistry, a genus of salts formed from the mellitic acid.

MELLITE, or *honey stone*, in mineralogy, takes its name from the yellow colour like that of honey. Its primitive figure is an octahedron. The crystals are small, their surface is commonly smooth and shining. Internally it is splendent. It is transparent, passing into the opaque, and possesses a double refraction. It is softer than amber and brittle. Specific gravity from about 1.5 to 1.7. It becomes electric by friction, but continues so but a short time. This mineral occurs on bituminous wood, and earthy coal, and is commonly accompanied with sulphur.

MELLITIC *acid*, is procured by boiling mellite reduced to powder, and boiled with about 72 times its weight of water, the alumina is precipitated in the form of flocks, and the acid combines with the water. By filtration and evaporation, crystals are

f fine needles, or
The acid is not
; its constituent
ogen, and oxygen.
e earths, alkalies
forms compounds

ny, a genus of the
ia class and order.
Caps. five celled,
eleven species, of
arkable is theolito-
nallow.
ous of the pentan-
order. Contorted;
f the tube, stellate;
seeded. There is
iudens, a native of

the agreeable ef-
s, ranged and dis-
that melody is the
or instrument, by
hed from harmony.
insects of the order
moniliform: tho-
nflected, gibbous;
Thirty-five species
M. proscarabæus,
blue-black or dark
advanced state of
pastures, creeping
ning so distended
he insect to move
ng roughly touched,
ellowish moisture
llow colour, and of
d peculiar smell.
es deposits her eggs
e surface of the
e hatched the lar-
ence by attaching
sects, and absorp-
vesicatorius, blister-
found chiefly in
t of great beauty,
ichest gilded grass
nne. This is the
the safest and most
r a blister-plaster.
n.s.
botany, a genus of
ia class and order.
eær. Cal. five-cleft;
etalled; berry three-
There is but one
a, a plant growing
Carolina and Virg-
grows to the size of
re, is picked when

of insects of the or-
ntennæ perfoliate;
the thorax; thorax
, emarginate; jaw
There are three
, the niger, and the

cture, denotes any
frieze, cornice or

llomr, a pliable tex-
en together in the

botany, a genus of
ia class and order.
alyx superior, corol-

la one petalled; anth. inserted in the side of the apex of the filament; berry crowned with a cylindrical calyx. There are four species, natives of warm climates.

MEMORY, a faculty of the human mind, whereby it retains or keeps the ideas it has once perceived.

Memory is, as it were, the store-house of our ideas. But our ideas being nothing but actual perceptions in the mind, which cease to be any thing when there is no perception of them; the laying up of our ideas in the repository of the memory, signifies no more than this; that the mind has a power, in many cases, to revive the perceptions it has once had, with this additional perception annexed to them, that it has had them before.

Attention and repetition help much to the fixing ideas in our memories: but those which make the deepest and most lasting impressions, are those which are accompanied with pleasure and pain. The memory of some men is tenacious almost to a miracle; but yet there seems to be a constant decay of all our ideas, even of those which are struck deepest, and in minds the most retentive.

Those ideas that are often refreshed by a frequent return of the objects or actions that produce them, fix themselves best in the memory, and remain longest there: such are the original qualities of bodies.

In memory the mind is oftentimes more than barely passive; for it often sets itself on work to search some hidden ideas; sometimes they start of their own accord; and sometimes tempestuous passions tumble them out of their cells. This faculty other animals seem to have to a great degree, as well as men.

MEMORY, *local*, among orators, is the associating the different heads to be handled, with the objects before the speaker's eyes; so that by looking around, he is put in mind of what he is to say.

MEMORY, *artificial*, *Memoria technica*, a method of assisting the memory, by forming certain words, the letters of which shall signify the date or æra to be remembered. In order to this, the following series of vowels, diphthongs, and consonants, together with their corresponding numbers, must be exactly learned, so as to be able at pleasure to form a technical word, that shall stand for any number, or to resolve such a word already formed.

a	*e*	*i*	*o*	*u*	*au*	*oi*	*ei*	*ou*	*y*
1	2	3	4	5	6	7	8	9	0
b	*d*	*t*	*f*	*l*	*s*	*p*	*k*	*n*	*z*

The first five vowels, in order, naturally represent 1, 2, 3, 4, 5, the diphthong *au* = 6, as being composed of *a* and *u*, or 1 + 5 = 6; and for the like reason, *oi* = 7, and *ou* = 9. The diphthong *ei* will easily be remembered for 8, as being the initials of the word. In like manner, where the initial consonants could conveniently be retained, they are made use of to signify the number; as *t* for 3, *f* for 4, *s* for 6, and *n* for 9. The rest were assigned without any particular reason, unless that possibly *p* may be more easily remembered for 7 or septem, *k* for 8, or ὀκτω, *d* for 2, or duo; *b* for 1, as being the first consonant; and *l* for 5, being the Roman letter for 50, than any others that could have been put in their places.

It is farther to be observed, that *z* and *y* being made use of to represent the cypher where many cyphers meet together, as 1000, 1000000, &c. instead of a repetition of *a z y z y z y* &c. let *g* stand for 100, *th* for a thousand, and *m* for a million. Thus *ag* will be 100, *ig* 300; *oug* 900, &c. *ath* 1000, *am* 1000000, *loum* 5900000, &c.

Fractions may be set down in the following manner: let *r* signify the line separating the numerator and denominator, the first coming before, the other after it; as *iro* $\frac{3}{4}$, *urp* $\frac{5}{7}$, *pourag* $\frac{79}{100}$, &c. When the numerator is 1 or unit, it need not be expressed, but begin the fraction with *r*; as *re* $\frac{1}{2}$, *ri* $\frac{1}{3}$, *ro* $\frac{1}{4}$, &c. So in decimals, *rag* $\frac{1}{100}$, *rath* $\frac{1}{1000}$.

This is the principal part of the method which consists in expressing numbers by artificial words. The application to history and chronology is also performed by artificial words. The art herein consists in making such a change in the ending of the name of a place, person, planet, coin, &c. without altering the beginning of it, as shall readily suggest the thing sought, at the same time that the beginning of the word being preserved, shall be a leading or prompting syllable to the ending of it so changed. Thus, in order to remember the years in which Cyrus, Alexander, and Julius Cæsar, founded their respective monarchies, the following words may be formed; for Cyrus, Cy*ruts*; for Alexander, Alex*ita*; for Julius Cæsar, Jul*ios*. *Uts* signifies, according to the powers assigned to the letters before-mentioned 536; *ita* is 331; and *os* is 46. Hence it will be easy to remember, that the empire of Cyrus was founded 536 years before Christ, that of Alexander, 331, and that of Julius Cæsar 46. This account is taken from a treatise, entitled, a New Method of Artificial Memory; where the reader will find several examples in chronology, geography, &c. of such artificial words disposed in verses, which must be allowed to contribute much to the assistance of the memory, since being once learned, they are seldom or never forgotten. However, the author advises his reader to form the words and verses himself, in the manner described above, as he will probably remember these better than those formed by another.

We shall, in this place, give his table of the kings of England since the conquest, where one thousand being added to the Italics in each word, expresses the year when they began their reigns. Thus,

Will con*sau*, Ruf*koi*, Hen*rag*
Steph*bil* & Hensec*buf*, Rich*bein*, Jo*nn*,
Hen*day* & Ed*doid*,
Ed*sefyp*, Ed*tertep*, Rise*tois*, Hef*otoun*,
He*ffutaque*.
Hen*fed*, Edqua*rfauz*, Ed Rol*t*, Hensep*feil*, Henoc*lyn*.
Edsex*los*, Mar*ylut*, Elsl*ut*, Jam*syd*. Caro*pimel*.
Carsec*sol*, Jam*seif*, Wil*seib*, An*pyd*, Geo*do-doi*.

MENACHANITE, a species of the titanium genus, is of a greyish black colour, inclining to iron-black; it occurs only in very small flattish angular grains, with a rough, glimmering surface; internally glistening; specific gravity 4.2 to 4.5. It is attractable by the magnet. Without addition it is infusible before the blow-pipe. Its constituent parts are, the black oxide of iron, 51; oxide of menachine, 45.25; oxide of manganese, 0.25; silex, 3.50. It is found abundantly in the bed of a rivulet which enters the valley of Menachan in Cornwall, whence its name.

MENAIS, a genus of the pentandria monogynia class and order. Nat. ord. of borragineæ. Cal. three-leaved; cor. salver-shaped; berry four-celled; seeds solitary. There is one species, viz. M. topiaria, a herb of South America.

MENDICANTS, several orders of friars, who having no settled revenues, are supported by charitable contributions.

MENILITE, in mineralogy, is of a yellowish nut-brown colour, inclining to liver brown: externally, it is marked with narrow stripes of reddish brown and pearl-grey. It is found in an adhesive slate at Menil Montagne, near Paris. The constituents are, silica, 85.50; alumina, [illegible]; oxide of iron, 0.50; calcareous earth, [illegible]; water and carbonaceous matter, [illegible].

MENISCIUM, in botany, a genus of the cryptogamia filices. Capsules lunulate or crescents, interposed between the veins of the frond. There is one species, viz. *M. reticulatum*, a native of [illegible] the West Indies.

MENISCUS, in optics, a lens convex on one side, and concave on the other. See *Optics*.

MENISPERMUM, moonseed, a genus of the dioecia dodecandria class and order. Male petals, four outer; eight inner; stamina sixteen: female, corolla as in the male; stamina, eight, barren; berries two, one-seeded. There are 13 species.

MENNONITES, a sect of baptists, who believe that the New Testament is the only rule of faith; that the terms person and trinity are not to be used when speaking of the Father, Son, and Holy Ghost; that the first man was not created perfect; that it is unlawful to swear, or to wage war upon any occasion; that infants are not the proper subjects of baptism; and that ministers of the gospel ought to receive no salary.

MENSES. See *Physiology*.

MENSTRUUM, in chemistry, a fluid in which a solid body is dissolved.

MENSURATION, is the art of ascertaining the contents of the superficial areas, or planes; of solids, or solid objects; and the lengths, breadths, &c. of various figures, either collectively or abstractedly. The mensuration of a plane superficies, or surface, lying level between its several boundaries, is easy. When the figure is regular, such as a square, or a parallelogram, the length multiplied by the breadth, will give its superficial contents. In regard to triangles, their bases multiplied by half their heights, or their heights by half their bases, will give the superficial measure.

Any rectilinear figure may have its surface estimated, however numerous its

be; simply dividing it into
y drawing lines from one an-
ter, but taking care that no
e made. Thus, if a triangle
qually subdivided, it may be
line, which must, however,
om any one point to the cen-
posite face.
essential figure is the circle,
athematicians conceive it im-
ascertain the area with perfect
xcept by the aid of logarith-
gebraic demonstration. It
icient here to state, that $8\frac{10}{17}$
eter, will give the side of a
ose area will be correspondent
a circle having 10 for its dia-
erefore, as the diameter may
ivided into ten equal parts,
hose parts into 17; by taking
and 10 of the 17 portions,
such a square may be easily
ed. Where a circle is small,
y be extended by an oblique
may be made to any extent.

nts of a pillar may be as-
ven though its diameter may
lly varying; for if we take
er) in different parts, and
n between every two adjoin-
ements, and multiply that mean
depth, or interval between
solid contents will be found.
ents of pyramids are measured
ing the areas of their bases by
ngths; or their lengths by half
their bases. Cones, whose
raight, are equal to one-third
ntents of cylinders equal to
e and altitude.
ich have a certain degree of
ay be easily measured: thus
omputed by multiplying first
y its length; then their sum by
See *Heights*, *Surveying*, *Geome-*
aging.
A, *mint*, a genus of the didyna-
spermia class and order. Nat.
llatæ, cor. almost equal, four-
roader segment emarginate:
right, distant. There are nine-
s. M. viridis, spearmint, pos-
more agreeable flavour than
others: it is generally prefer-
nary, and some medicinal pur-
herb contains a good deal of
l as do all the other mints; but
less agreeable odour than that
or marjoram. It is a native
parts of Europe.
LIA, a genus of the polyan-
ynia class and order. Nat. ord.
themæ. Calyx five-leaved;
-petalled; capsule inferior, cy-
ny seeded. There is one spe-
. aspera, an annual plant of

NTHES, a genus of the pentan-
ynia class and order. Nat.
, Jussieu. Cor. shaggy, stigma
le one-celled. There are five
which M. nymphoides, fringed
or water-lily, has a long, strin-
al root, the stems are round
, and jointed, producing op
leaves, floating on the *surface* of the water. The flowers grow from the axils in a kind of sessile umbel, four or five together on long round peduncles, shorter than the petioles; when expanded in the sun they have a brilliant appearance.

MERCATOR'S projection of Maps. See *Maps*.

MERCHANT, a person who buys and sells commodities in gross, or deals in exchanges; or that traffics in the way of commerce, either by importation or exportation.

A merchant engaged in extensive trade should be acquainted with the following parts of commercial learning: 1. He should write properly and correctly. 2. Understand all the rules of arithmetic that have any relation to commerce. Know how to keep books of double and single entry, as journals, a ledger, &c. 4. Be expert in the forms of invoices, accounts of sales, policies of insurance, charter-parties, bills of lading, and bills of exchange. 5. Know the agreement between the money, weights, and measures of all parts. 6. If he deals in silk, woollen, linen, or hair manufactures, he ought to know the places where the different sorts of merchandizes are manufactured, in what manner they are made, what are the materials of which they are composed, from whence they come, the preparations of these materials before working up, and the places to which they are sent after their fabrication. 7. He ought to know the lengths and breadths which silk, woollen, or hair stuffs, linen, cottons, fustians, &c. ought to have, and their different prices, according to the times and seasons. 8. If he trades in oils, wines, corn, &c. he ought to inform himself of the appearances of the succeeding crops in order to regulate his disposing of what he has on hand; and to learn what they have produced when got in, for his direction in making purchases and engagements. 9. He ought to be acquainted with the sorts of merchandise found more in one country than another, those which are scarce, their different species and qualities, and the properest method for bringing them to a good market. 10. To know which are the merchandises permitted or prohibited, as well on entering as going out of the kingdoms or states where they are made. 11. To be acquainted with the price of exchange, and what is the cause of its rise and fall. 12. To know the customs due on importation or exportation of merchandises, in the places to which he trades. 13. To know the best manner of folding up, embaling, or tunning the merchandises. 14. To understand the price and condition of freighting, and insuring ships and merchandize. 15. To be acquainted with the goodness and value of all necessaries for the construction, repairs, and fitting out of shipping; with the different manner of their building. 16. To know the wages commonly given to the captains, officers and sailors, and the manner of engaging with them. 17. He ought to understand foreign languages, particularly the French, Spanish, Italian, and German. 18. He ought to be acquainted with the consular jurisdiction, with the laws and customs of the different countries, and in general all the ordinances and regulations both at home and abroad that have any relation to commerce.

A material requisite for forming a merchant is, his having on all occasions a strict regard to truth, and his avoiding fraud and deceit as corroding cankers that must inevitably destroy his reputation and fortune.

Trade is of so universal a nature that it is impossible for the laws of one country to determine all the affairs relating to it; therefore all nations, as well as Great Britain, shew a particular regard to the LAW-MERCHANT, which is a law made by the merchants among themselves; however, merchants and other strangers are subject to the laws of the country in which they reside.

MERCURIALIS, in botany, *mercury*, a genus of the diodecia enneandria class and order. Natural order of tricoccæ. Euphorbiæ, Jussieu. Essential character: male, calyx three-parted; corolla none; stamina nine or twelve: anthers globular, twin: female, calyx three-parted; corolla none; styles two; capsule dicoccous, two-celled, one-seeded. There are six species.

MERCURY, or *Quicksilver*, a metal which retains its fluidity at the common temperature of the atmosphere. When the temperature is reduced to about 40 deg. below zero of Fahrenheit, it assumes a solid form. When congealed, its specific gravity is so much increased, that it sinks to the bottom of the fluid mass. It has been increased from 13.5 to 15.6. At about 600 deg. of Fahrenheit, it boils, and is changed into vapour, and this method is taken to purify it from the admixture of other metals. When very pure, mercury is not oxydized at the common temperature of the atmosphere, but may be converted into an oxyde by boiling. It is dissolved by hot sulphuric acid, and forms a white salt, which being washed with boiling water, produces a yellow substance called turbith mineral. It may likewise be dissolved by nitric acid with and without heat. It may be united to the muriatic acid by a double elective affinity: thus when sulphate of mercury and muriate of soda, both dry, are mixed and exposed to heat, a combination of oxide of mercury and muriatic acid is obtained by sublimation: this is called in the shops "Corrosive sublimate." Calomel is compounded of the same substances, but with a larger proportion of mercury. Corrosive muriate of mercury is in the form of a white compact mass, tending to a crystalline arrangement: it is soluble in about twenty parts of water, at the temperature of 60 deg. and in two parts of boiling water. In alcohol much larger portions are dissolved. The taste of this salt is styptic and disagreeable, and it acts as a most virulent poison, so that although it is used in medicine, it cannot be administered in larger quantities than the 6th or 8th of a grain.

The oxides of mercury are reducible by heat, without the addition of any combustible substance, and afford oxygen gas. Mercury dissolves gold, silver, tin, and other metals, and if combined therewith in sufficient quantity it loses its fluidity, and forms an amalgam. An amalgam of lead, and another of bismuth, have the property of becoming fluid. Its combination with sulphur affords two compounds. By long trituration these bodies unite, and form a black powder. When united by fusion, and afterwards sublimed, a red sulphuret is produced, called cinnabar.

From its property of uniting with other metals mercury is used to separate gold and silver from the substances with which they are mixed. It is thus capable of extracting the hundredth thousandth part of its weight of gold. In gilding and silvering, it is the medium of union between the gold and silver, and the metal on which the operation is performed. Its amalgam with tin is used for silvering mirrors, and in electrical experiments. Its importance in the structure of the barometer is well known; and the uniformity of its expansion at various degrees of heat, has proved it to be the best fluid for thermometers.

MERCURY, in astronomy, the smallest of the planets, and the nearest to the sun.

MERCURY, in heraldry, a term used in blazoning by planets, for the purple colour in the arms of sovereign princes.

MERGANSER. See *Mergus*.

MERGER, in law, is when a less estate in lands, &c. is drowned in the greater.

MERGUS, in ornithology, a genus of the order anseres. Bill toothed, serrated, slender and hooked at the point; nostrils small, oval, and near the base of the bill; feet four-toed, the outer toe before longer than the middle one. There are ten species: M. merganser, or goosander weighs about four pounds, and is twenty-eight inches long. It is common in the northern regions of Europe and Asia, and is found in the Orkneys during the whole year. It builds generally in the holes and fissures of rocks, and lives on fish. Its flesh is strong, and rather unfit for food. M. albellus or the smew, is about 16 inches long; the head is ornamented with a long crest white above and black beneath; the tail of a deep ash-colour, the legs bluish grey—rest of the body white. M. serrator, or red-breasted goosander, is considerably less than the former, is found also in the same latitudes, and breeds in the north of Scotland. It dives excellently, and is extremely alert in the water. These birds like the others of the genus, subsist in a great degree on fish. They fly near the surface of the water, with great vigour, and their bills are admirably adapted to secure their prey.

MERIDIAN, in astronomy, a great circle passing through the poles of the world, and both the zenith and nadir, crossing the equinoctial at right angles, and dividing the sphere into two hemispheres, the eastern and western: it has its poles in the east and west points of the horizon. It is called meridian, because when the sun cometh to the south part of this circle, it is then mid-day; and then the sun has its greatest altitude for that day. See *Astronomy* and *Geography*.

MERIDIAN *line*, on a dial, is a right line arising from the intersection of the meridian of the place, with the plane of the dial.

, *magnetical*, is a great
through the magnetical
h the magnetic needle con-

altitude of the sun and stars,
t when in the meridian of
re they are observed. See

AL *distance*, in navigation,
h the departure, easting or
difference of longitude be-
idian under which the ship
ny other meridian she was

arts, Miles, or *Minutes*, in
e the parts by which the
Mr. Wright's chart (com-
falsely called Mercator's)
e parallels of latitude de-
the cosine of the latitude
is equal to the radius or
of that parallel; therefore,
-chart, or nautical plani-
dius being the radius of the
whole sine of 90 deg. the
ts at each degree of lati-
ease, as the secants of the
l between that latitude and
, decrease. The tables,
neridional parts, in books
re made by a continual ad-
ts; they are calculated in
every degree and minute
d will serve either to make
Mercator's chart, or to work
s sailing. To use them,
with the degree of latitude
d the minute on the first
s the left hand, and in the
ng you will have the me-
Having the latitudes of
nd the meridional miles or
en them, consider whether
es lies on the equator, or
ne side of it, or lastly, on
1. If one of the proposed
he equator, then the me-
nce of latitude is the same
de of the other place, taken
of meridional parts. 2.
osed places be on the same
ator, then the meridional
latitude is found by sub-
eridional parts answering
and the difference is that
f the places lie on differ-
equator, then the meri-
ce of latitude is found by
r the meridional parts an-
latitude, and the sum is

e *Falco*.
fortification, that part of
ch is terminated by two
a battery. Its height and
same with that of the pa-
breadth is generally nine
le, and six on the outside.
ver those on the battery
y; it should be made of
and close.
enus of birds of the order
character: bill quadran-
t curved, compressed, and
ils small, at the base of
slender, and in some spe-
e outer toe somewhat con-
middle one. *Gmelin* notices twenty-six species and Latham twenty. M. apiaster, or the common bee-eater, this is about ten inches long, and found in many countries of Europe, though never observed in Great Britain. It is particularly fond of bees, but will eat various other insects; many of which it seizes, like the swallow, on the wing. When insects are with difficulty to be found, it feeds on many species of seeds.

MESEMBRYANTHEMUM, in botany, *fig-marigold*, a genus of the icosandria pentagynia class and order. Nat. ord. of succulentæ. Calyx five cleft; petals numerous, linear; capsule fleshy, inferior, many seeded. There are seventy-five species, of which M. nodiflorum, Egyptian fig-marigold is a native of Egypt, where they cut up the plants, and burn them for pot-ash. M. crystallinum, diamond fig marigold, or ice plant is also an annual, distinguished by its leaves and stalks being closely covered with pellucid pimples full of moisture, which, when the sun shines on them, reflect the light appearing like small bubbles of ice.

MESENTERY, a thick fat membrane, placed in the midst of the intestines. See *Anatomy*.

MESNE, he who is lord of a manor, and has tenants holding of him, yet himself holds of a superior lord.

MESNE PROCESS, an intermediate process, which issues pending the suit, upon some collateral interlocutory matter. Sometimes it is put in contradistinction to final process, or process of execution; and then it signifies all such process as intervenes between the beginning and end of a suit.

MESPILUS, in botany, a genus of the icosandria pentagynia class and order. Natural order of pomaceæ. Calyx five cleft; petals five; berry inferior, five seeded. There are nine species. M. germanica, Dutch or common medlar, never rises with an upright trunk, but sends out crooked deformed branches, not far from the ground; leaves large, entire, downy on their under side; flowers very large, as also the fruit, which approaches to the shape of an apple. This tree bearing the largest fruit is now generally cultivated; the Nottingham medlar, has a more poignant taste, but the fruit is considerably less.

MESSENGERS, are certain officers chiefly employed under the direction of the secretaries of state, and always in readiness to be sent with all kinds of dispatches foreign and domestic. They also, by virtue of the secretaries' warrants take up persons for high treason, or other offences against the state.

MESSERSCHIMIDIA, a genus of the pentandria monogynia class and order. Natural order of asperifolia. Corolla funnel form, with a naked throat; berry suberous, bipartile, each two seeded. There are two species, viz. M. fructicosa and arguzia.

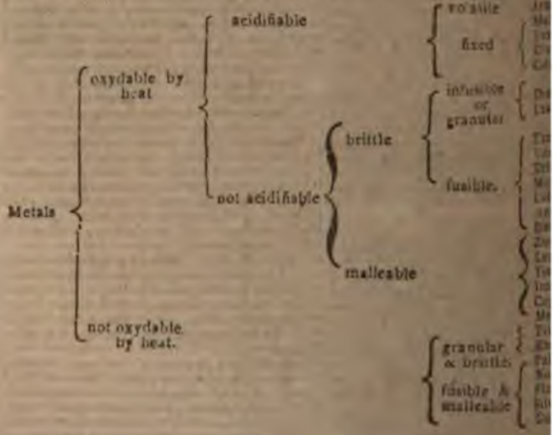
MESUA, a genus of the monadelphia polyandria class and order. Nat. ord. of gutiferæ, calyx simple, four leaved; corolla four petalled; pistil one; nut four cornered, one seeded. There is one species; viz. M. ferrea, a native of the East Indies it is much cultivated in Malabar, for the beauty of its white flowers; it bears fruit from the nut at six years old, and continues frequently bearing during three centuries. It is a very large tree, the fruit when ripe has a rind like that of the chesnut, with three or four kernels within of the substance, shape, and taste of chesnuts.

METACARPUS, in anatomy, that part of the hand between the wrist and the fingers.

METALS, are inflammable bodies, being all capable of combining with oxygen; and many of them, during this combination, exhibit the phenomena of combustion. Formerly only seven metals were known, but modern discoveries have added to the number about twenty others, which are distinguished by their great specific gravity, considerable tenacity and hardness, opacity, and property of reflecting the greater part of the light which falls on their surface, giving rise to what is denominated the metallic lustre or brilliancy. To these have been added two others by Mr. Davy, called *Potassium* and *Sodaium*, which see. Of the others the principal characteristic is their superior specific gravity. In this they exceed all other bodies, the lightest being about six times heavier than water, while the specific gravity of the heaviest substance with which we are acquainted, that is not metal, is less than five times heavier than water. Opacity is another leading property of metals; even when beat to the greatest possible thinness, they transmit scarcely any light: from the union of the two qualities density and opacity, arises that of lustre. By their opacity and the denseness of their texture, they reflect the greater part of the light that falls on their surface. From their density they are susceptible of a fine polish by which their lustre is increased. Colour is not a character-

istic property of metals, but
distinguish them from each
colours are generally shades
grey, or yellow. Tenacity
a number of the metals,
possessed in any great degree
bodies; hence arises their
and ductility. Some of the
neither malleable nor ductile
are less hard than the diamond
ny fossils, and their elasticity
same order as their hardness.
qualities are greater in comb
the metals than in the individ
and both may be increased by
metal to a high temperature, and
denly cooling it. Metals are the
ductors of caloric; their expa
are various, and are probably
the order of their fusibilities.
melts at so low a temperature,
be obtained in the solid stat
very low temperature; others,
can scarcely be melted by the
tense heat, which we can excit
gealing, some of the metals exp
siderably, especially iron, bis
antimony; the others contract,
ty-third of the whole volume.
may be volatilized; at the deg
quicksilver may be volatilized,
arsenic at a temperature not
from this; many others may be
in the focus of a large burning
by a powerful galvanic batter
are the best conductors of elec

Metals are susceptible of com
they have an affinity to oxygen,
carbon, sulphur, phosphor
each other, and when comb
oxygen, to all the acids, to the
and to the earths. The metals
dently of potassium and sod
be thus enumerated and arrang



raldry. There are two
eraldry, by way of co-
and silver, in blazon
rgent. In the common
these metals are repre-
and yellow, which are
irs of those metals. In
is expressed by dotting
ll over; and silver, by
blank.
Y, comprehends the
orking metals from the
e utensil; hence assay-
ning, smelting, &c. are
metallurgy. In a more
includes only the opera-
followed in separating
r ores.
certained that an ore of
worked with advantage,
proceeds in his opera-
, a square perpendicular
dug in the ground, suf-
o place strait ladders in
machinery is fixed, for
aising and lowering ves-
ch it is sometimes neces-
es to draw off the water
d. If the ore is too deep
t to lead from the grass
e vein at the bottom of
a horizontal gallery is
end of which a second

ck to be perforated is
l capable of supporting
will not require to be
; but if it is soft and fri-
necessary to support the
ry with pieces of wood-
with planks all round.
ost important particulars
loring mines, is the reno-
. When it is practicable
y which shall lead from
e shaft to the day or open
easily established by this
When this is not possi-
afts is sunk to the extre-
allery, opposite to that
was sunk. When one
pens at a different level
, the circulation and re-
air are easy. If the se-
of equal height, the cur-
ake place spontaneously,
determined by causing
municate with a lighted

waters which overflow
retard the operations, at
that they threaten the
rkmen, is no less neces-
ovided against. If the
s gradually through the
let off into the plain or
r by means of a horizontal
lected in a greater quan-
possible to open such an
s extracted by pumps.
ve elastic fluids, which so
disengaged in the cavities
particularly the carbonic
ifferent species of mixed
more or less pernicious,
most formidable enemies
lleries, *fires, ventilators,
by means of torches held*
at a great distance in those parts of the mines which are mephitized by the inflammable gases, and particularly the various methods of causing fresh air to enter, are the only remedies which can be opposed to these subterraneous evils.

Few metals are found in a pure state; gold, silver, and sometimes copper, are exceptions. The other metals are generally found in the state of ores, in which they are mixed and blended with other substances, so as not to have the ductility or other qualities of metals: often, indeed, they have not the metallic lustre. Sometimes the ore is only a pure oxide, which requires no more than that the oxygen should be drawn from it by heating it with an inflammable substance. Such are all the ferruginous ochres, which are oxides of iron.

The ores of metals are generally found in the veins of mountains or rocky strata, and are always separated from the rocks on each side by a quantity of spar, quartz, or sometimes softer clay or earth. The spar is generally of the gypseous kind. These form the matrix of the ore: in English called the rider. In different veins it is of different thicknesses; the quantity of the ore increasing as that of the matter which surrounds it diminishes. Often the ore is in branching masses wandering irregularly through it, and is often rudely mixed with the matrix in veins of different thicknesses. These are called brangled ores.

The veins or fissures of the rocky strata are sometimes only a few inches wide, and sometimes many yards. In rich mines there are immense masses of ore many feet broad. Where the veins happen not to be filled up, the ores are found crystallized round the cavity.

The ore, when separated from the matrix, generally contains some other matter; as sulphur, arsenic, or both: and sometimes an earthy substance, the whole being united into a compound which at first appears homogeneous.

The first operation on metals is to separate the ore from the matrix. When the ore is found in large masses, most of it may be dug up free from the matrix, and those pieces to which it adheres may be freed by a hammer. But as the ore is often intimately mixed with the matrix, it is necessary to try other methods.

Sometimes the whole is reduced to powder and thrown into water; the water is then put in motion, and the earthy matter floats above the ore, on account of their different specific gravity. It is still better to place the powder on a board, over which water may be made to run; being stirred while the water runs over it, the earthy parts float and are carried off, whilst the metallic parts remain behind. This operation is called washing the ore.

When the matrix is not divisible by water, a stamping-mill is employed, which consists of an axis turned by a water-wheel. On the axis there are a number of cogs, which lift up a perpendicular pillar of wood plated at bottom with iron; this falling down bruises the matrix to powder. It often happens that the matrix is harder than the ore, and in [illegible] into powder [illegible] application of water [illegible] the appearance of gypseous spar. [illegible] is not reduced so easily [illegible] more easily [illegible]

Metal [illegible] melting the whole mass into [illegible] is performed in some [illegible] furnaces, and [illegible] with the addition of [illegible] stones, [illegible] which [illegible] promote the [illegible] of the new [illegible] metallic matter settles [illegible] the state of an ore, [illegible] process is called crude separation. When the ore is thus freed from its [illegible], the next operations are, to separate the sulphur, arsenic, &c. which the metals may contain; and this must be done [illegible], because of their [illegible] metals. If exposed [illegible] separate [illegible] consequence [illegible] with [illegible] charged [illegible] process.

[illegible] this operation, the [illegible] necessary. It is often [illegible]

[illegible] are two [illegible] One [illegible] something [illegible] existing [illegible] which treats of beings [illegible] While a third [illegible] means "that part of [illegible] considers the nature [illegible] thinking beings." Th[illegible] must evidently [illegible] nature [illegible] are either [illegible]

The word seems to [illegible] with Aristotle, who has [illegible] which is placed after τα φυσικα. So that it [illegible] something, "beyond ph[illegible] "an appendix to his p[illegible] history. This treatise [illegible] the intellectual world.

The mode in which [illegible] ed of metaphysics is [illegible] definitions of the term[illegible] der the form of a trea[illegible] presents us with a [illegible] words, their meaning [illegible] gether with an [illegible] considerations [illegible] with a volume [illegible] on the being and att[illegible] the nature of spiritual [illegible] telligences; and a [illegible] moral [illegible]

A science so [illegible] extensive, [illegible] terms, [illegible] proper subject for a [illegible] What are [illegible] Nothing [illegible] subjects which the [illegible] in calling metaph[illegible] der three classes, viz. fire-balls, falling or shooting stars, and ignes fatui.

Those phenomena which are classed together under the general appellation of fire-balls, were divided by the antients into several species, according to the external form or appearance which they assumed.

In tropical climates these meteors are more common and more stupendous than in these more temperate regions. But they sometimes also visit the more temperate regions of Europe.

Two of them appeared in England in the year 1783, the first of them was seen on the 18th of August, and was, in appearance, a luminous ball, which rose in the N. N. W. nearly round; it, however, soon became elliptical, and gradually assumed a tail as it ascended, and, in a certain part of its course, seemed to burst, after which it proceeded no longer as an entire mass, but was apparently divided into a cluster of balls of different magnitudes, and all carrying or leaving a train behind, till, having passed the east, and verging considerably to the south, it gradually descended, and was lost out of sight. The time of its appearance was about sixteen minutes past nine in the evening, and it was visible about half a minute. It was seen in all parts of Great Britain, at Paris, at Nuits in Burgundy, and even at Rome; and is supposed to have described a tract of 1000 miles at least over the surface of the earth.

The illumination of these meteors is often so great as to totally obliterate the stars, to make the moon look dull, and even to affect the spectators like the sun itself. The body of the fire-ball, even before it burst, did not appear of a uniform brightness, but consisted of lucid and dull parts, which were constantly changing their respective positions, so that the whole effect was like an internal agitation or boiling of the matter. Its height seems to have varied from 55 to 60 miles.

A report was heard some time after the meteor disappeared, and this report was loudest in Lincolnshire and the adjacent parts, and again in the eastern parts of Kent. Judging from the height of the meteor, its bulk is conjectured to have been not less than half a mile in diameter; and when we consider this bulk, its velocity cannot fail to astonish us, which is supposed to be at the rate of more than 20 miles in a second.

The other meteor, which appeared on the 4th of October, 1783, at 43 minutes past six in the evening, was much smaller than the former, and of a much shorter duration. It was first perceived to the northward, as a stream of fire, like the common shooting stars, but large; but presently burst out into that intensely bright blueish flame, which is peculiar to such meteors. It left behind it a dusky-red streak of fire, and except this, had no [illegible], but was nearly globular. After mov[illegible] not less than 10 degrees in this bright state, it became suddenly extinct without any explosion. The height of the meteor must have been between forty and fifty miles; and its duration was not more than three seconds.

Dr. Blagden is of opinion, that the general cause of these phenomena is electricity, which opinion he grounds upon the following circumstances: 1st, The velocity of these meteors, in which they correspond with no other body in nature but the electrical fluid. 2dly, The electrical phenomena attending meteors, the lambent flames, and the sparks proceeding from them, which have sometimes damaged ships and houses in the manner of lightning; and, added to these, the hissing sound, resembling that of electricity passing from a conductor. As a third argument in favour of this hypothesis, the doctor remarks the connection of meteors with the northern lights. Instances are recorded, where northern lights have been seen to join, and form luminous balls, darting about with great velocity, and even leaving a train like fire-balls. The aurora borealis appears to occupy as high, if not higher, region above the surface of the earth, as may be concluded from the very distant countries to which it has been visible at the same time. 4thly, The most remarkable analogy, the doctor thinks, is the course of at least all the larger meteors, which seems to be constantly from or towards the north or north-west quarters of the heavens.

Notwithstanding the doctor's ingenious arguments, we cannot subscribe to the opinion, that these phenomena are altogether electrical. The duration of the fire-ball, the unequal consistency of the mass, and several other points in the narration, seem to indicate that its materials were of a less rare and evanescent nature than the electric fire.

The shooting or falling star is a common phenomenon; but though so frequently observed, the great distance and transient nature of these meteors have hitherto frustrated every attempt to ascertain their cause. The connection of these with an active state of the atmospheric electricity, is however certain from observation; and we have more reason to consider them as electric scintillæ than as solid or fluid matter in the act of combustion. They precede a change of wind.

Concerning the nature and composition of the *ignis fatuus*, or Will-with-a-wisp, there is less dispute; the generality of philosophers being agreed, that it is caused by some volatile vapour of the phosphoric kind, probably the phosphorized hydrogen gas. The light from putrescent substances, particularly putrid fish, and those sparks emitted from the sea, or sea-water when agitated, in the dark, correspond in appearance with this meteor.

METEORIC STONES. Almost all the larger fire-balls have been observed to disappear with a loud explosion; and it was almost constantly affirmed that heavy stony bodies fell from them. But though several well-authenticated accounts of the fall of such stones had been from time to time published, little credit was given to them by philosophers, till Dr. Chladni published a dissertation on the subject in 1794. Two years after, Mr. King published a still more complete collection of examples, many of them supported by such evidence that it was impossible to reject it. Mr. Howard having procured

India. The meteors either really do, or appear to, move horizontally, and are said to descend ere they explode. The stones are of different sizes, and from a few ounces in weight to several tons; they are generally circular, and invariably covered with a rough black crust, which, according to Howard, is principally composed of oxide of iron. The stones which fell at Laigle in France in 1803, yielded by the analysis of Vauquelin and Fourcroy, 54 parts silica, 36 oxide of iron, 19 magnesia, 5 oxide of nickel, 2 sulphur, and 1 lime:—and Mr. Howard found that 150 grains of a meteoric stone which fell in Yorkshire contained 75 silica, 37 magnesia, 48 oxide of iron, 2 oxide of nickel. The oxidizement of the metallic bodies caused this increase of weight.

Various conjectures have been formed as to the origin of these stones; some, with Laplace, supposing them to be ejected by volcanoes in the moon; and others, with Sir W. Hamilton and Mr. King, that they are concretions formed in the atmosphere.

METEOROLOGY, the doctrine of meteors, or the study of the variable phenomena of the atmosphere.

The atmosphere may be considered in respect of the direction of its currents or winds; of the variations in its gravity or pressure; of the changes in its temperature; of the state of the electricity which it exhibits; and lastly, as to the visible phenomena which are supposed to depend on the foregoing.

Winds, though proverbially uncertain in some climates, are yet not without a striking degree of regularity and system, if we consider the whole atmosphere; and there is a part of the world where the wind is so constantly in one quarter, that *windward*, in common speech, stands for eastern, and *leeward* for western. We want only a more extensive set of observations to render exceedingly probable

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Peru	0.20	—
Calcutta	0.77	—
Cape Town	—	0.89
Naples	1.00	—
Dover	2.47	1.80
Liverpool	2.89	1.96
Petersburgh	3.45	2.77

America, however, the range
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Except on the eve of great storms, the rising movement is however the more rapid of the two. The undulations which are to be found in the curve corresponding to the interval between the phases of the moon, often comprehend in their sweep some smaller ones, which appear to be due to occasional and less extensive causes.

It happens also from some principle of the kind above stated, that these movements, which in fair and moderate weather proceed with considerable regularity, on being disturbed by storms, are not resumed suddenly but by degrees, and the interruption is perceptible for a considerable space afterwards.

In long periods of wet weather, the barometer usually keeps about the mean altitude, rising and falling through a short space with little regularity.

In serene and settled weather it is generally high; and low in calm weather, when the air is inclined to rain; it sinks on high winds, rises highest on easterly and northerly winds, and sinks when the wind blows from the south.

Various attempts have been made to explain these phenomena, but hitherto without any great degree of success. The theory of Mr. Kirwan, from whom we have abstracted the following observations, appears the most plausible, though it is not sufficient to explain all the facts:

The density of the atmosphere is greatest at the poles, and least at the equator; as the centrifugal force at the latter, the distance from the centre of the earth, and the heat, contributing to lessen the density of the air, are at their maximum, when at the pole it is exactly the reverse. In every part of the world the mean height of the barometer placed at the level of the sea will be found to be 30 inches, consequently, the weight of the atmosphere is the same in all places; its weight depending on its density and height; where the former is greatest the height must be the least, and where its density is least the height is the greatest. It will therefore, appear that the height of the atmosphere must be least at the poles, and greatest at the equator, decreasing gradually in the interval, and thus forming the resemblance of two inclined planes, meeting at the highest part above the equator.

The difference of the mean heat between the pole and the equator, when the sun is in our hemisphere in the summer, does not vary so much as in the winter, as the heat at that period in northern countries equals that of the torrid zone.

The pressure of the superincumbent column in a great measure causes the density of the atmosphere, and therefore decreases in proportion to the height as the pressure of the column constantly decreases, yet the density in the torrid zone does not decrease so rapidly as in the temperate and frigid. as the column is longer, and because there is a larger proportion of air in the upper part of it.

The density at the equator, though less at the surface of the earth, must equal at a certain height, and still higher exceed the density in the temperate zones, and at the poles; but a current of air constantly ascends at the equator, part at mosphere; that density will be most considerable where it is coldest, and its column shortest. Chains of mountains, the summits of which are covered with snow great part of the year, and highlands, must be colder than places less elevated in the same latitude, and the column of air over them much shorter. The current of air above must be impeded and accumulate while on its passage over these places towards the poles.

After the accumulations have existed some time the surrounding atmosphere becomes incapable of balancing the density of the air, when it descends with violence, and occasions cold winds, which raise the barometer; it is to this that we are to attribute the rise of the barometer, almost always attending north-east winds in Europe, which is the effect of accumulations near the pole, or in the north-west parts of Asia.

When in the polar regions large quantities of air are casually compressed; the southern atmosphere must rush in to replace it, which occasions south-west gales and the fall of the barometer.

The mean heat of our hemisphere varying in successive years, the density of the atmosphere, and necessarily, the quantity of equatorial air passing towards the poles, cannot be otherwise than variable; hence occurs the different ranges of the barometer, in successive years; at some particular periods, more considerable accumulations take place in the highest parts of Asia, and the south of Europe, than at others, which may be produced by early falls of snow, or the interruption of the sun's rays by long continued fogs; at such times the atmosphere in the polar regions becomes proportionably lighter, and this causes the prevalence of southerly winds in some winters more than in others. The heat of the torrid zone never greatly varying, the height and density of the atmosphere undergoes but few chan-

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this, called the term of congelation, which varies with circumstances and seasons. M. Bouguer places another, called by him the upper term, and beyond this no visible vapour ascends.

The following is Mr. Kirwan's rule for obtaining the temperature at any given height, admitting that the temperature at the surface of the earth is known. "Let the observed temperature at the surface of the earth be $=m$, the height given $=h$, and the height of the upper term of congelation for the given latitude be $=t$; then $\frac{m-32}{\frac{t}{100}-1}=$ the diminution of temperature for every 100 feet of elevation; or it is the common difference of the terms of the progression required. Let this common difference thus found be denoted by c, then $c+\frac{h}{100}$ gives us the whole diminution of temperature from the surface of the earth to the given height. Let this diminution be denoted by d, then $m-d$ is obviously the temperature required. An example will make this rule sufficiently obvious. In latitude 56 deg. the heat below being 54 deg. required the temperature of the air at the height of 803 feet.

Here $m=54$, $t=5{,}533$. $\frac{m-32}{\frac{t}{100}-11}=\frac{22}{54.33}$ $=0.404=c$, and $c+\frac{h}{100}=0{,}404+8.03=3.24=d$, and $m-=54-3.24=50.75$: here we see that the temperature of the air 803 feet above the surface of the earth is 50 deg. 75 min.

Estimating the diminution from this method, we find that heat lessens in an arithmetical progression: and from the same premises it may be concluded, that the warmth of the air at some distance from the earth is not to be attributed to the rising of heated strata of air from the earth's surface, but to the conducting power of the air.

The upper strata of the atmosphere are frequently warmer in winter than the lower, and the preceding rule is applicable to the temperature of the air during the summer months only. According to the Philosophical Transactions for 1777, a thermometer placed on the summit of Arthur's Seat, the thirty-first of January, the year before, stood six degrees higher than a second at Hawk hill, situated 684 feet below it: this superior heat is considered by Mr. Kirwan to be produced by a current of heated air flowing from the equator towards the north pole during our winter.

It has been a generally received opinion, that the southern hemisphere, beyond the fortieth degree of latitude, is much colder than the corresponding parts of the northern: this is true only with respect to the summer of the former; but the winter in the same latitude is milder than in the latter.

Inconsiderable seas, in temperate and cold climates, are colder in winter and warmer in summer than the standard ocean, as they are necessarily under the influence of natural operations from the land, and its temperature.

Continents have a colder atmosphere than islands situated in the same degree of latitude; and countries lying to the windward of the superior classes of mountains, or forests, are warmer than those which are to the leeward. Earth always possessing a certain degree of moisture, has a greater capacity to receive and retain heat than sand or stones; the latter therefore are heated and cooled with more rapidity: it is from this circumstance that the intense heats of Africa and Arabia, and the cold of Terra del Fuego, are derived. The temperature of growing vegetables changes very gradually; but there is a considerable evaporation from them: if these exist in great numbers, and congregated, as in forests, their foliage preventing the rays of the sun from reaching the earth, the immediate atmosphere must be greatly affected by the ascent of chilled vapours.

Air is one of those bodies which have received the name of electric, it not only contains that portion of electricity which seems necessary to the constitution of all terrestrial bodies, but it is liable also to be charged negatively or positively when electricity is abstracted or introduced by means of conducting bodies. These different states must occasion a variety of phenomena, and probably contribute considerably to the various combinations and decompositions continually going on in air. Professor Beccaria of Turin, found the air almost always positively electrical, especially in the day-time and in dry weather. When dark or wet weather clears up, the electricity is always negative. Low thick fogs rising into dry air carry up a great deal of electric matter. In the morning, when the hygrometer indicates dryness equal to that of the preceding day, positive electricity obtains even before sunrise. As the sun gets up, this electricity increases more remarkably if the dryness increases. It diminishes in the evening. The mid-day electricity of days equally dry is proportional to the heat. Winds always lessen the electricity of a clear day, especially if damp. For the most part, when there is a clear sky with little wind, a considerable electricity arises after sunset at dew-falling.

Air is not only electrified by friction, like other electric bodies, but the state of its electricity is changed by various chemical operations which often go on in the atmosphere. Evaporation seems in all cases to convey electric matter into the atmosphere. On the other hand, when steam is condensed into water, the air becomes negatively electric. Air, when heated, becomes negatively electric, and positively when cooled, even when it is not permitted to expand or contract: and the expansion and contraction of air also occasion changes in its electric state.

As air is an electric, the matter of electricity, when accumulated in any particular strata, will not immediately make its way to the neighbouring strata, but will induce in them changes similar to what is induced upon plates of glass or similar bodies piled upon each other. Therefore, if a stratum of air is electrified positively, the stratum immediately above it will be negative, the stratum above that positive, and so on. Suppose now that an imperfect conductor were to come into contact with each of these strata: we know from the principles of electricity that the equilibrium would be restored, and that this would be attended with a loud noise, and with a flash of light. Clouds are imperfect conductors; if a cloud, therefore, comes into contact with two such strata, a thunder-clap will follow. If a positive stratum is situated near the earth, the intervention of a cloud will, by serving as a stepping-stone bring the stratum within the striking distance, and a thunderclap will be heard while the electrical fluid is discharging itself into the earth. If the stratum is negative, the contrary effects will take place. It does not appear, however, that thunder is often occasioned by a discharge of electric matter from the earth into the atmosphere. The accidents, most of them at least, which were formerly ascribed to this cause, are now much more satisfactorily accounted for by lord Stanhope's theory of the returning stroke. The discharge from the clouds directly into the earth is also probably less frequent than from cloud to cloud.

The far greater part of the visible phenomena of the atmosphere are due to the water, which, being raised by evaporation, is transported from place to place in vapour, and which, physically speaking, is a proper component part of the air. When by any means a portion of this is deprived of its constituent caloric, it reappears in minute drops, which are at first uniformly diffused, and lessen the transparency of the air in proportion to their abundance.

The next stage is *dew*, or rather *haze*, for the latter term seems more appropriate to the appearance of dew while it is falling. Here the drops have so far become collected as to form an aggregate faintly defined in the air. To this succeed various definite aggregates, under the general term *cloud*. Out of the latter are formed rain, snow, and hail, by which the product of evaporation is finally restored to the earth. The excess for any given time, of the falling water over that which is evaporated, passes off by the springs and rivers to that grand reservoir which forms the far greater part of the surface of the globe.

Tracts of forest, especially if mountainous, invite the rain, and protect the springs; while the accumulated heat on cultivated plains often causes the clouds to pass over them, or to be dissipated.

The quantity of rain taken at an annual mean, is the greatest at the equator, and it decreases gradually to the poles; but there are fewer days of rain there, the number of which increase in proportion to the distance from it. From north latitude 12 deg. to 43 deg. the mean number of rainy days is 78; from 43 deg. to 46 deg. the mean number is 103; from 46 deg. to 50 deg. 134; and from 51 deg. to 60 deg. 161. Winter often produces a greater number of rainy days than summer, though the quantity of rain is more considerable in the latter than in the former season. Mountainous districts are subject to great falls of rain: among the Andes particularly it rains almost incessantly, while the flat country of Egypt is consumed by endless drought. The rain gauge affords reason to suppose, that a greater quantity of rain falls in the lower strata of the atmosphere than in those above, which may be accounted for by the drops attracting vapour in their near approach to the earth. Mr. Copland, of Dumfries, has however discovered the rain collected in the lower gauge was greater when it continued falling for some time, and that the greatest quantity was collected in the higher during short rains, or at the conclusion of lengthened ones.

As rain is known to fall at all hours of the day and night, and at every season of the year, it is apparent that it is caused by operations which prevail generally, and without defined interruption.

The mean annual quantity of rain for the whole globe has been calculated to be about 34 inches. The superficies of the globe consists of 170,981,012 square miles, or 686,401,498,471,475,200 square inches: the quantity of rain, therefore, falling annually will amount to 23,337,650,812,030,156,800 cubic inches, or somewhat more than 91,751 cubic miles of water. There are 62,745,850 square miles of dry land on the globe; consequently the equal amount of the quantity of rain descending upon it will be 30,800 cubic miles. The sea is supposed to receive 13,140 cubic miles of water, which flows into it annually; therefore it must supply an equal quantity by evaporation. Mr. Dalton estimates the quantity of rain falling in England at 31 inches.

Snow is formed by a process of rapid crystallization among minute frozen particles of water floating in the air. Previous to and during the fall of snow in quantity, the temperature continues about 32 deg. It should seem that the evolution of the constituent caloric of the water produces the same effect when it is formed in the atmosphere, as when it is formed in water. The structure of a crystal of snow demonstrates that a drop of rain is also formed by the union of a great number of smaller drops. When these come together in the act of freezing, and suddenly, they form a nucleus of white spongy ice, which, by its extreme coldness, becoming incrusted with new ice from the water it collects in its descent, constitutes hail as we usually see it. Sometimes, however, the nucleus falls unincrusted, which is a presage of sharp frosts. Hail has been likewise observed perfectly transparent, and having the form of an oblate spheroid, showing that it consisted of drops which had been frozen entire in falling with a rotatory motion.

METHOD, in logic, &c. the arrangement of our ideas in such a regular order, that their mutual connection and dependance may be readily comprehended.

METHOD, in botany, is a mode of arrangement from certain agreements or circumstances of resemblance. There are two kinds of methods in arranging vegetables, the natural method is that which, in its distribution, retains all the

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ion there is between them.
c.
. See *Architecture*.
in poetry. See *Hexameter*,
&c.
IDEROS, a genus of the class
icosandria monogynia. The
ve-cleft, half-superior; petals
ina very long, standing out;
nple; capsule three-celled.
13 species, of New Holland,

ON. See *Daphne*.
TINTO. See *Engraving*.
, among physicians, denotes
nous effluvia of pestilential
hereby they are communicated
t a distance.
This stone forms an essential
ny mountains, and has been
under the names of glacies
Muscovy glass. It consists
number of thin laminæ adher-
other, sometimes of a very
Specimens have been found
nearly 2½ yards square. Its
oliated. Its fragments flat. The
exible, and somewhat elastic.
h. It has long been employed
tute for glass; it is not so liable
en by the agitation of the ship.
UXIA, in botany, a genus of
ria monogynia class and order.
campanaceæ. Calyx sixteen
rolla wheel-shaped, eight-parted;
ght-valved, staminiferous; cap-
celled, many-seeded. There
species, viz. M. campanuloides,
ed michauxia: this is a hand-
nial plant.
LIA, in botany, a genus of the
polygynia class and order.
coadunatæ. Calyx three-
petals fifteen; berries many,
d. There are two species, na-
East Indies.

MICROMETER, an astronomical machine, which, by means of a screw, serves to measure extremely small distances in the heavens, &c. and that to a great degree of accuracy.

The micrometer consists of a graduated circle, of a screw and its index. The threads of the screw are such, that 50 make the length of one inch exactly. When it is to be used, the point is set to the side of the part to be measured, and then the index is turned about with the finger, till the eye perceives the point has just passed over the diameter of that part; then the number of turns, and parts of a turn, shewn by the graduated circle, will give the dimensions in parts of an inch.

Micrometers have been contrived by various persons; that invented by Mr. Cavallo, consists of a small semitransparent scale or slip of mother-of-pearl, about the 20th part of an inch broad, and of the thickness of common writing paper. It is divided into a number of equal parts by means of parallel lines. This micrometer is situated within the tube, at the focus of the eye-lens of the telescope, where the image of the object is formed, and with its divided edge passing through the centre of the field of view. It is to be fixed upon the diaphragm, which generally stands within the tube at the focal distance of the eye-lens.

By looking through the telescope, the image of the object and the micrometer will appear to coincide; hence the observer may easily see how many divisions of the latter measure the length or breadth of the former; and knowing the value of the divisions of the micrometer, he may easily determine the angle which is subtended by the object.

MICROPUS, in botany, a genus of the syngenesia polygamia necessaria class and order. Nat. ord. compositæ nucamentaceæ. Calyx calicled; ray of the corolla none; female, florets wrapped up in the calycine scales; down none; receptacle chaffy. There are two species, natives of Spain and the Levant.

MICROSCOPE. See *Optics*.

MICROTEA, a genus of the pentandria digynia class and order. The calyx is five-leaved, spreading; corolla, none; drupe, dry, echinated. There is one species, an annual of the West Indies.

MIDWIFERY, in the restricted sense of the word, is the art of assisting women in childbirth. It is generally, however, made to comprehend the management of women, both previously to, and some time after, delivery; as well as the treatment of the infant in its early state.

One of the most uniform circumstances attending pregnancy, is the stoppage of the menses. Now, although this stoppage is a natural event, and occasioned by the increased demand of the uterine organs for the supply of its new charge, yet, under some circumstances, this sudden change of the blood's determination, as it has been called, produces inconvenience. Here in some few instances, venesection, as preparatory to other treatment, may be necessary; but nothing can be a more dangerous principle to admit, than that vertigo, and depression, and sleeping, whether with or without pregnancy, are to be combated by withdrawing blood from the body. When bleeding is judged necessary in pregnancy, care should be taken not to withdraw a large quantity, as in chronic inflammation. Three or four ounces are generally sufficient to answer all the purposes that bleeding is intended to accomplish; but for the most part, the sickness, loathing, mental depression, head-ache, and even vertigo, which sometimes accompany the earlier periods of pregnancy, are best combated by very gentle and temperate exercise, by endeavouring to promote a cheerful train of thought, and by taking nourishing, at the same time avoiding, a diet that is stimulating and irritative.

With respect to the heartburn, and other stomach and bowel complaints, in the incipient stages of uterine gestation, they are to be treated in the same manner as when arising independently of the pregnant state. The bilious symptoms, as they are denominated, for which emetics are prescribed, are in general best counteracted by mild laxative medicines, accompanied by tonic bitters, especially columba and quassia, with magnesia and rhubarb, which, with air and moderate exercise, prove also highly useful in a state of nervous irritability. Opiates are sometimes required. When the breasts of a pregnant female appear unusually tense and painful, tight lacing must be avoided with the utmost solicitude; sometimes it is necessary to bathe the mammæ with oil, or to apply some unctuous substance; and if much febrile irritation should attend upon the complaint, gentle laxatives should be had recourse to.

Those affections which are incident to the more advanced stages of pregnancy and which depend upon the change of situation of the uterus, and pressure on parts in its vicinity, are oftentimes of a more urgent and alarming nature; these are suppressions of, or difficulty in passing, urine; a retroversion of the uterus, obstinate costiveness, the hæmorrhoids, dropsical and varicose swellings of the legs and thighs, pains in the back, &c. cough, difficulty of breathing, incontinence of urine, and lastly, violent convulsive or epileptic fits.

The causes disposing to abortion are, much weakness and irritability of the frame; the more immediately exciting causes are, violent passions of the mind, excessive bodily agitation, or mechanical injuries.

When we have reason to apprehend abortion, every attention is to be given to avoid exciting causes. On the first appearance of menacing symptoms, the patient should be principally confined to a horizontal position, the diet should be nourishing but not irritating; the mind should be kept as free as possible from agitation; and crowded irregularly heated apartments shunned.

When the hæmorrhage has come on, and the abortion followed, vegetable astringents are to be given, with opiates and bark; the bowels are at the same time to be kept evacuated; and in cases of great debility, port wine is to be plentifully taken.

That enlargement of the uterus, by which it adapts itself to the increasing size of its contents in pregnancy, has certain limits. In the course of thirty-nine weeks from conception, it refuses to undergo any further enlargement; hence contractile efforts, by which those contents are expelled, which constitute labour-pains. These, at first, are comparatively feeble, and only recur after a considerable interval; afterwards, however, they become more frequent and forcible; till at length, from the power of uterine contraction, aided by the action of the diaphragm and abdominal muscles, the membranes are ruptured, the os uteri dilated, and the child born.

The prognosis of labour cannot, with precision, be formed. The most ordinary limits of a natural easy labour, from the actual commencement, is, from six to twelve hours: sometimes, however, it is completed at the end of two hours, and at others is protracted for some days. In most cases of parturition there is little indication for the interference of the midwife, nature performing her part without the aid of art; but in very difficult and preternatural labours, recourse should be had to a skilful medical practitioner or accoucheur. Sometimes from the malconformation of the mother or child, it becomes necessary to employ the forceps and other instruments, and even, to proceed to the Cæsarean operation or to embryotomy.

Management of Lying-in Females.

Most of the complaints which succeed to delivery owe their origin to injudicious nursing, improper cordials, heated apartments, impure air, and a disregard of the mandates of nature, on the part of the female, in neglecting to suckle her offspring. The way to prevent the occurrence of such affections as sometimes follow parturition, is to preserve a free circulation of air in the lying-in room, guarding against the admission of partial streams or currents; to forbid the practice of keeping up large fires, to avoid indiscriminately taking medicines, in compliance with custom or the nurse's whim, and to present the breast, as soon as possible, to the new-born infant.

In cases where the patient after delivery is exceedingly feeble, and the succeeding pains are violent, opiates are necessary. Where a tendency to deliquium is perceived, wine and other cordials are given with the utmost propriety; but to give either the one or the other in large quantities, for successive periods, merely because the female is lying-in, is highly improper, and often extremely detrimental.

An inordinate quantity of bed-clothes, irritating diet, heated rooms, and deficient ventilation, are the principal sources of puerperal diseases. The miliary eruptions which break out on the skin, either at this or any other period, are almost universally attributed to heating irritating regimen.

When inflammation of the abdomen, or other parts in the vicinity of the uterus, occurs soon after delivery, a cool regimen is required, with gentle laxatives; be-rder to obviate the extraordinary tency to exhaustion and gangrene, diserable under these circumstances, um, wine, and bark must be given in junction with diaphoretic medicines. erperal fever, attended with inflamtion of parts, is a highly asthenic and gerous malady.

When febrile irritation is indirect from retention of the milk, this fluid must be wn off by means of glasses, evacuat- ; medicines are to be given, and afterrds absorption promoted by the application to the breast of a simple plaster. from this cause, from exposure to cold, from any other accident, actual inmmation is occasioned in one of the easts, it will be requisite to have recurse to anodyne fomentations, or to ollient poultices. When the irritation the nipple from the child's suckling is ry troublesome, oily applications uld be made use of; and of these, at which has been found one of the most icacious, is the oil of wax (ol. ceræ). For the management of the infant, see *fancy*.

MIEGIA, in botany, a genus of the triandria monogynia class and order. Calyx e-flowered; corolla two valved; necy one-valved, involving the germ, seed quetrous rounded, included within the lyx, corolla, and nectary. There is t one species, viz. M. maritima, a nare of the sandy coasts of Cayenne and uiana.

MIGRATION, *of birds*. Many kinds of rds annually pass from one country to nother, and spend the summer or the inter where it is most agreeable to them, where they can find suitable food, d even the birds of our own island will ek the most distant southern regions Africa, when directed by a peculiar stinct to leave their own country. It has ng been an opinion pretty generally reived, that swallows reside during the inter season in the warm southern reons. But besides the swallow, Mr. ennant enumerates many other birds hich migrate from Britain at different nes of the year, and are then to be und in other countries; after which they ain leave these countries, and return Britain. These are the hooded crow, e cuckow, the wryneck, the hoopoe, ouse, ring-doves, turtle-doves, the stare, rushes, chatterers, grosbeaks, buntings, iches, larks, fly catchers, wagtails, arblers, nightingales, black-caps, wilw-wrens, white-ears, white-throats, at-suckers, several kinds of water-fowl, ch as herons, curlews, snipes, sandpers, plovers, oyster catchers, rails, phaopes, grebes, avosets, auks, divers, n, petrels, merganse-rs, several species ducks, and corvorants.

MILE, *milie passus*, a measure of length distance, containing eight furlongs, c. *See Measure.*

The English statute mile is fourscore ains, or 1760 yards; that is 5280 feet. e *Chain*, *Yard*, and *Foot*.

We shall here give a table of the miles use among the principal nations of rope, in geometrical paces, (60,000 of ich make a degree of the equator.

	Geometrical paces.		yards
Mile of Russia	75[illegible]	or	[illegible]
of Italy	1000	or	[illegible]
of England	1250	or	1760
of Scotland and Ireland	1500	or	2200
The small league	2500	or	[illegible]
The mean league	25.0	or	[illegible]
The great league of France	3500	or	44.0
Mile of Poland	3000	or	44 0
of Spain	3 48	or	5028
of Germany	40 0	or	5[illegible]
of Sweden	5000	or	7 3
of Denmark	5000	or	7[illegible]
of Hungary	6000	or	8800

MILIARY FEVER, a malignant fever, so called from the eruption of certain pustules resembling millet-seeds.

MILIUM, *millet*, a genus of the digynia order, in the triandria class of plants; and in the natural method ranking under the 4th order, gramina. Calyx bivalved, uniflorous; corolla very short; stigmata pencil-like. There are 12 species, of which the most remarkable is the effusum, or common millet.

MILK, the fluid designed for the nourishment of young animals, and which is secreted in particular organs by the females of the class mammalia. It is white and opaque having a sweetish taste; and a specific gravity somewhat greater than that of water. When milk is allowed to remain at rest, it separates into a thick white fluid, called cream, which collects on the surface, and into a fluid beneath which is more watery. The quantity of cream obtained from milk, and the time it requires to separate, vary according to the nature of the milk, and the temperature of the atmosphere. When the milk is allowed to stand after the spontaneous separation of the cream, it first becomes acescent, and then coagulates. When the coagulum is pressed gently, a serous fluid is forced out, and the remainder is the caseous part or pure cheese. Butter and cheese are obtained artificially: the former by the operation of churning, and the milk which remains after the butter has been separated, or, as it is called, the butter milk, has the properties of milk from which the cream has been separated. Cheese is obtained by the addition of rennet to the milk, which is prepared by digesting the inner coat of the stomach of young sucking animals, especially that of the calf. The quality of the cheese depends upon the quantity of cream remaining in the milk. The best cheese is obtained by coagulating the milk at the temperature of 100°, and expressing the whey slowly and gradually, without breaking down the curd. When [illegible] [illegible] is [illegible], and [illegible] precipitated [illegible] transparent and colourless. By slow evaporation it deposits crystals of sugar of milk, with some muriate of potash, muriate of soda, and phosphate of lime. The liquid which remains after the separation of these salts is converted by cooling, into a gelatinous substance. If whey be kept, it becomes sour by the formation of the acetic acid, and it is to this that the spontaneous coagulation of milk is owing. Milk may at first, when sour, be fermented, and it will yield a vinous intoxicating liquor. Milk is likewise susceptible of the acetous fermentation.

tion. The constituent parts which enter into the composition of milk, are water, oil, curd, gelatine, sugar of milk, muriate of soda, muriate of potash, phosphate of lime, and sulphur.

The milk of different animals is composed of nearly the same substances: but the proportions vary so much, as to give them very different properties. Every kind of milk produces cream. In that of the cow it is copious, thick, and yellow. In woman's milk the quantity is small, and it is white and more liquid. Goat's milk produces abundance, and it is thicker and whiter than that from the cow. Ewe's milk produces as much as that of the cow, and of nearly the same colour. The cream from asses' milk resembles women's. In mare's milk it is very fluid. and similar in colour and consistence to good cow's milk before the cream appears on the surface.

Butter obtained from the milk of the cow differs in colour; but has always much consistency. That from women's milk is small in quantity, insipid, and of a pale yellow. The butter of asses' milk is white, and soft, and disposed to be rancid. That from goat's milk is abundant, white, and soft. That from ewe's milk is yellow and soft: that from mare's milk has little consistence, and is readily decomposed.

The caseous part of milk varies in different animals. That from the milk of the cow is bulky, and retains much serum. That from women's milk is small in quantity, has an unctuous feel, and but a small portion of whey. The curd of asses' milk is similar to that of women's, but not unctuous. Curd from the milk of the goat is abundant, of a firmer consistence than that of the cow, and retains less whey. Curd from ewe's milk is fat and viscid: that from mare's milk is very similar to what is obtained from women's milk.

The serum, or whey, constitutes a great proportion of the milk. That from the milk of the cow has a greenish cast, and a sweet taste; it contains sugar of milk and neutral salts. The whey from women's milk has little colour; but contains much saccharine matter. The whey of asses' milk is colourless, and contains less salts and more sugar than that of the cow. Whey of the goat is yellowish, and contains very little sugar and saline matter. The latter is muriate of lime. The whey of ewes' milk is always colourless, and contains the smallest quantity of sugar, and but a small portion of muriate and phosphate of lime. That of mare's milk has little colour, and contains a large proportion of saccharine matter, and of saline substances.

MILKY-WAY, in astronomy, a broad track or path encompassing the whole heavens, distinguishable by its white appearance, whence it obtains its name.

MILL, is a machine, which by means of any adequate force, as steam, water, wind, or animal exertion, acquires such an additional power as enables the machinery to act with encreased effect, and with requisite regularity.

Where coals are cheap, the steam engine being so immensely forcible, and capable of any desirable bulk, is
instances preferred. Where fuel
and that a stream of adequate
be applied, water becomes the
tum; but where neither of the
can be found under suitable circ
ces, a well exposed spot is ordina
lected for the erection of a wind-

Water is generally made to act
machines, particularly water-whe
means of its momentum when in

To compute the effects of water-
with precision, it is necessary t
tain, 1. The real velocity of the
which acts upon the wheel;
quantity of water expended in a
time; and 3. how much of the p
counterbalanced, or lost, by the fri
the machinery. Mr. Smeaton est
after a variety of experiments,
mean power of a volume of w
inches in height gave 8.96 feet of
in each minute to a wheel on w
impinged. The computation of th
to produce such an effect, allow
head of water to be 105.5 inches
264.7 pounds of water descending
minute through the space of
inches: therefore 264.7, multiplie
was equal to 3,970. But as that
is found equal to raising no mo
9.375 pounds to the height of 135
it was manifest that a major par
power was lost, for the multip
of these two sums amounted to n
than 1,266; of course the frictio
equal to ¾ths of the power.

Mr. Smeaton considers the
the maximum single effect of wat
an undershot wheel, where the
fifteen inches. The remainder of
it is plain, must be equal to th
velocity of the wheel itself, mu
into the weight of the water, w
this case brings the true propor
tween the power and the effect
3,849 to 1,266; or as 11 to 4.

Where a wheel revolved *86* ti
minute, the velocity of the water m
been equal to 86 circumferences
wheel; which according to the dim
of the apparatus used by Mr. Sm
as 86 to 30, or as 20 to 7. The grea
with which the wheel would move
6oz., by *12lb.* it was entirely stopt.
this we are to conclude, as Mr. S
did, that the impulse of the water
than double what the theory states
This he accounts for by the wheel
placed in a narrow slit; so that the
could not escape but by passing w
wheel's motion; thus giving a mu
force. Further, it is to be rem
that when a float-board comes in c
with the water, it receives a certain
which causes the back, or upper
the float-board to become loaded
kind of wane, which accumulates
sequence of the momentary impu
and consequently adds to the im
This added force must ever be in p
tion to the depth to which the flo
sinks into the stream; not excee
whole depth beyond the rim, or b
the wheel to which it is attached.

The following conclusions resu
the velocities of wheels, as act
by different heights of water.

head, or altitude, being the same, the effect will be proportioned to the quantity of water expended; or in other words according to the weight and velocity of the impinging fluid. 2. The expence or quantity of water being the same, the effect will be nearly in proportion to the height of the head. 3. The quantity of water expended being the same, the effect is nearly as the square of the velocity. 4. The aperture whence the fluid issues being the same, the effect will be nearly as the cube of the velocity. 5. The virtual head, or that from which we calculate the power, bears no proportion to the head-water, but when the aperture is larger, or the velocity of the water less, they approach nearer to a coincidence: consequently in the large openings of mills and sluices, where great quantities of water are discharged from moderate areas, the head of water, and the virtual head (determined from the velocity) will nearly agree, as experience proves. 6. The most general proportion between the power and effect is as 10 to 3; the extremes are 10 to 3, 2, down to 10, 2.8. 7. The proportion of velocity between the water and the wheel is usually as 5 to 2. 8. Although we have no certain maximum of the power of a wheel; that is, what it will carry, and no more; we may generally consider the limits to be that wheels which work freely with 15, will stop when 20 are opposed to their motion: consequently when 3 is the effect, 4 will stop the work.

Float-boards should be rather numerous than few. Mr. Smeaton found, that in undershot mills, when he reduced the number of floats from twenty-four to twelve, the effect was reduced one-half, because the water escaped between the floats without touching them; but when he added a circular sweep of such length, that before one float-board quitted it another had entered it, he found the former effect nearly restored.

This mode more particularly applies to breast-wheels, or such as receive the water immediately below the level of the axis. In such the circular trough is indispensable; because the water would not communicate the full effect desirable from the joint operations of velocity and weight. In this kind of wheels it is proper that the float-boards should be confined both at their sides and at their extremities, so that the water may accompany all the way from the head down to the lowest part of the wheel, whence it should draw off with sufficient readiness to allow the succeeding fall to supply its place, without being in the least retarded.

The over-shot wheel is by far the most powerful; both because it receives the water at the very commencement of descent, and that the buckets with which this kind of wheel is ordinarily furnished retain the power until they gradually discharge their contents, as these buckets successively become inferior parts of the circumference. Much may be effected by allowing the water merely to flow upon the upper part of the wheel into the superior buckets, whereby an immense auxiliary power is erected as they successively become filled. The *more slowly* any body descends by the force of gravity, while acting upon any piece of machinery, the more of that force will be spent upon it, and consequently the effect will be the greater. Mr. Smeaton found, that when his wheel, which was two feet in diameter, revolved twenty times in a minute, its effect was greatest: when it made only 18½ turns the effect was irregular: and when so laden as not to make 18 turns, the wheel was overpowered by the load. Thirty turns in the minute occasioned a loss of about $\frac{1}{20}$th, and when turned 40 times in a minute, the diminution of effect was nearly one fourth of its powers. This proportion may be easily estimated on any wheel of greater extent, by computing the proportion of accumulated power lost by greater velocity than may be sufficient to load the wheel by means of the buckets being filled; observing that the progress of a machine may be so much retarded as to cause the effect to be irrelevant to the purpose, although the machine may be kept in motion.

The maximum load for an overshot wheel is that which reduces the circumference of the wheel to its proper velocity, which is known by dividing the effect it ought to produce in a given time by the space intended to be described by the circumference of the wheel in the same time. The quotient will be the resistance overcome at the circumference of the wheel; it is equal to the load required, including the friction and the resistance of the machinery. Much, however, depends on the proper precautions for reducing the friction of the several moving parts.

Corn is ground by two mill-stones, placed one above the other, without touching. The lower, or nether mill-stone, is immovable; but the upper one turns upon a spindle. The opposite surfaces of the two stones, which act to grind the corn, are not plane or flat; but the upper one is hollow, and the under one swells upwards; each of them being of a conic figure, whose axis indeed is very short in proportion to the diameter of its base: for the upper one, being six feet in diameter is hollowed but about one inch at its centre; and the lower one rises but about three-fourths of an inch. These two mill-stones come nearer and nearer towards their circumference, whereby the corn that falls from the hopper has room to insinuate between them as far as two-thirds of the radius, which is the place where it begins to be ground, and where it makes the greatest resistance that it is capable of; the space between the stones being in that place but about two-thirds or three-fourths of the thickness of a grain of corn. But as the millers have the means of raising or sinking the upper stone a little, they can proportion its distance from the lower one, according as they would have the flour finer or coarser.

The circular motion of the upper mill-stone brings the corn out of the hopper by jerks, and causes it to recede from the centre towards the circumference; where being quite reduced to flour, it is thrown out of the mill, by the centrifugal force of the stone, through a hole provided on purpose.

Practical rules for the construction of mills.—1. Measure the perpendicular height of the fall of water, in feet, above that part of the wheel on which the water begins to act, and call that the height of the fall.

2. Multiply this constant number 64.2882 by the height of the fall in feet, and the square root of the product will be the velocity of the water at the bottom of the fall, or the number of feet the water there moves per second.

3. Divide the velocity of the water by three, and the quotient will be the velocity of the float-boards of the wheel, or the number of feet they must each go through in a second, when the water acts upon them so as to have the greatest power to turn the mill.

4. Divide the circumference of the wheel in feet by the velocity of its floats in feet per second, and the quotient will be the number of seconds in which the wheel turns round.

5. By this last number of seconds divide 60, and the quotient will be the number of turns of the wheel in a minute.

6. Divide 120 (the number of revolutions a mill-stone of four feet and a half diameter ought to have in a minute) by the number of turns of the wheel in a minute, and the quotient will be the number of turns the mill-stone ought to have for one turn of the wheel.

7. Then, as the number of turns of the wheel in a minute, is to the number of turns of the mill-stone in a minute, so must the number of staves in the trundle be to the number of cogs in the wheel, in the nearest whole numbers that can be found.

By these rules the following table is calculated to a water-wheel 15 feet in diameter, which may be a good size in general.

THE MILLWRIGHT'S TABLE.

Heigh of the fall of water.	Velocity of the fall of water per second.		Velocity of the wheel per second.		Revolutions of the wheel per minute.		Revolutions of the mill-stone for one of the wheels.		Cogs in the wheel, and staves in the trundle		Revolutions of the mill-stone per minute by these staves and cogs.	
Feet.	Feet.	100 parts of a foot.	Feet.	100 parts of a foot.	Revolutions.	100 parts of a rev.	Revolutions.	100 parts of a rev.	Cogs.	Staves	Revolutions.	100 parts of a rev.
1	8	02	2	67	2	83	42	40	254	6	[illegible]	[illegible]
2	11	34	3	78	4	00	30	00	210	7	[illegible]	[illegible]
3	13	89	4	63	4	91	24	44	196	8	[illegible]	[illegible]
4	16	04	5	35	5	67	21	16	190	9	[illegible]	[illegible]
5	17	93	5	98	6	34	18	92	170	9	[illegible]	[illegible]
6	19	64	6	55	6	94	17	28	156	9	[illegible]	[illegible]
7	21	21	7	07	7	50	16	00	144	9	[illegible]	[illegible]
8	22	68	7	56	8	02	14	96	134	9	[illegible]	[illegible]
9	24	05	8	02	8	51	14	10	140	10	[illegible]	[illegible]
10	25	35	8	45	8	97	13	38	134	10	[illegible]	[illegible]
11	26	59	8	86	9	40	12	76	128	10	[illegible]	[illegible]
12	27	77	9	26	9	82	12	22	122	10	[illegible]	[illegible]
13	28	91	9	64	10	22	11	74	118	10	[illegible]	[illegible]
14	30	00	10	00	10	60	11	32	112	10	[illegible]	[illegible]
15	31	05	10	35	10	99	10	92	110	10	[illegible]	[illegible]
16	32	07	10	69	11	34	10	58	106	10	[illegible]	[illegible]
17	33	06	11	02	11	70	10	26	102	10	[illegible]	[illegible]
18	34	02	11	34	12	02	9	98	100	10	[illegible]	[illegible]
19	34	92	11	65	12	37	9	70	98	10	[illegible]	[illegible]
20	35	86	11	95	12	68	9	46	94	10	[illegible]	[illegible]
1	2		3		4		5		6		7	

To construct a mill by this table, find the height of the fall of water in the first column, and against that heighth in the sixth column, you have the number of cogs in the wheel, and staves in the trundle, for causing the mill-stone, four feet six inches diameter, to make about 120 revolutions in a minute, as near as possible, when the wheel goes with one-third part of the velocity of the water. And it appears by the 7th column, that the number of cogs in the wheel, and staves in the trundle, are so near the truth for the required purpose, that the least number of revolutions of the mill-stone in a minute is 118, and the greatest number never exceeds 121; which is according to the speed of some of the best mills.

One of the most usual communications of motion in machinery, is by means of toothed wheels acting on each other. It is of the greatest consequence to have the teeth so formed, that the pressure by which one of them urges the other round [illegible] is constantly the same. The ends of the teeth should never be formed of parts of circles, but of a particular curve, called the epicycloid, which is formed by moving the circle, called the generating circle, round the circumference of another circle, while it turns also round its own centre; then any point will describe an epicycloid

ierves, that the teeth of
sot to act upon each other
ve at the line which joins
and though the inner and
the teeth may be of any
better to make both sides
ill serve to make the wheel
ds. The more teeth that
the better; at least one
ways begin before the other
ing. The teeth ought to be
not to trouble or hinder
fore they begin to work.
d, are, in their general con-
h the same as water-mills;
e difference of the power
y are acted upon.
e and *hand*. These ma-
their action from animal
e-mills, one, two, or more
r cattle, are made either to
before them, levers, which
a centre shaft, bearing the
al wheel that gives motion
mote parts, and which act
ess effect, according to the
levers, and the number of
ed.
k, perform their office by
f large beams called beetles
fted in successive order fall
herein the bark, previously
aced. Madder and many
are also broken in the same
er is made from rags, which
n sieves, &c. and soaked,
l in a mill, which tears the
apart, and reduces the whole
.

, are very simple in their
they being nearly the same
lls; consisting of troughs
eed is broken by the passage
ylinders, or cones, of iron or
erwards put into presses for
of forcing the oil from the

per and *brass*, are almost in-
ked by water, having large
ve immediate action to ham-
weight; these beat out the
d bricks of metal into various
as kettles, coppers, boilers,
out sheets for various purpo-
cially for coppering the bot-
s. This process is effected
e heated metal between two
nders, of about a foot diame-
ving contrary motions, draw
small interval left between
by reducing the thickness,
urface to the sheet.
t, *cotton*, &c. require much
eir construction; their prin-
nents depend on the same
those of the mills described
he more minute parts, such as
&c. being moved by means of
leather straps passing them
act, so as to occasion them to
an astonishing degree of ve-

w, though extremely simple
, require the greatest care in
ion. The saws, which are
nks, must be set with most
xactness. In most instances
brought forward to the saw

by means of a small toothed wheel, and an axle whereon the rope that pulls the timber is gradually coiled.

MILLS, *flax*, are generally worked by cattle; their construction is simple; the essential parts being the hackle, which combs the flax; and the scutcher, which strikes it: both tend to clearing away the coarser and unequal fibres, and to prepare the material for being spun either by hand, or by means of machinery.

MILLENARIANS, or *Chiliasts*, a name given to those who, in the primitive ages, believed that the saints will one day reign on earth with Jesus Christ a thousand years.

MILLEPES. See *Oniscus*.

MILLEPORA. See *Madrepore*, *Zoophites*.

MILLERA, a genus of the syngenesia polygamia necessaria class of plants, the compound flower of which is radiated; there is scarcely any visible receptacle of the seeds, which are single after each particular flower, and have no pappus or down. There are three species.

MILLET. See *Millium*, and *Panicum*.

MILLET-GRASS. See *Milium*.

MILLING. See *Fulling*.

MILLION, in arithmetic, the number of ten hundred thousand, or a thousand times a thousand.

MILLREE, a Portuguese gold coin, equal to 5*s*. 7½*d*. of our money.

MIMOSA, the *sensitive plant*, a genus of the polygamia order, in the monœcia class of plants, and in the natural method ranking under the 33d order, Lomentaceæ. The hermaphrodite calyx is quinquedentate; quinquefid; five or more stamina, one pistil, and a legumen; male calyx quinquedentate; cor. quinquefid, with five, ten, or more stamina.

The name mimosa signifies "mimic;" and is given to this genus on account of the sensibility of the leaves, which, by their motion, mimic or imitate the motion of animals. This genus comprises 55 different species, all natives of warm climates. The sensitive kinds are exceedingly curious plants in the very singular circumstance of their leaves receding rapidly from the touch, and running up close together; and in some sorts the footstalks and all are affected, so as instantly to fall downward as if fastened by hinges, which last are called humble sensitives. They have all winged leaves, each wing consisting of many small pinnæ.

M. sensitiva, or the common sensitive humble plant, rises with an under-shrubby prickly stem, branching six or eight feet high, armed with crooked spines; conjugated, pinnated leaves, with bijugated partial lobes or wings, having the inner ones the least, each leaf on a long footstalk; and at the sides and ends of the branches many purple flowers in roundish heads; succeeded by broad, flat, jointed pods, in radiated clusters. This is somewhat of the humble sensitive kind; the leaves, footstalks and all, receding from the touch, though not with such facility as in some of the following sorts.

M. pudica, or bashful humble plant, rises with an under-shrubby, prickly stem, branching two or three feet round, [illegible] upon the [illegible] pillar are [illegible] and are commonly [illegible] which is [illegible] each wing [illegible] ght parts, [illegible] the name of [illegible]

M [illegible] again, [illegible] the place [illegible] resembling [illegible] Arabia [illegible] many. At [illegible] great age [illegible]

[illegible] a considerable [illegible] The transaction is [illegible] flowing, and the part [illegible] is to be moved, is [illegible] cording to Dr. Nicholls [illegible] names, they seem to [illegible] when the [illegible]

[illegible] water running [illegible] they are [illegible] to the waters having [illegible] as being obliged to [illegible] hole he stopped up the [illegible] that is one new and [illegible] made. Many mines have [illegible] by accident [illegible] rich vein of [illegible] Germany; [illegible] having up [illegible] pieces of rocks [illegible] the same [illegible] ers, earthquakes, [illegible] wonder [illegible] stone, or [illegible]

The principal signs of [illegible] vein, seem reduced [illegible] such as, 1. The [illegible] covered waters. 2. The [illegible] the trees or grass of [illegible] ing of pieces of ore [illegible] ground. 4. The [illegible] 5. The finding of metal [illegible] All which [illegible] ments for making [illegible] the places where [illegible] appears, [illegible]

ularly the form and situation of the
ould be well considered. A mine
ither happen, 1. In a mountain.
hill. 3. In a valley. Or, 4. in a
ut mountains and hills are dug
ich greater ease and convenience,
because the drains and burrows,
the adits or avenues may be here
cut out, both to drain the water
orm gangways for bringing out the
. In all the four cases we are to look
he veins which the rains, or other
tal thing, may have laid bare; and
i vein be found, it may often be
o open the mine at that place, es-
if the vein prove tolerably large
: otherwise the most commodious
r situation is to be chosen for the
, viz. neither on a flat nor on the
nountains, but on the sides. The
ation for a mine, is a mountainous,
wholesome spot; of a safe easy
and bordering on a navigable

, in military affairs, is also a
neous cavity made according to
s of art, in which a certain quan-
owder is lodged, which by its ex-
blows up the earth above it. It
n found by experiment that the
roduced by the explosion is a pa-
; and that the centre of the pow-
charge, occupies the focus. The
where the powder is lodged is
he chamber of the mine, or for-
The passage leading to the powder
the gallery.
ine drawn from the centre of the
r, perpendicular to the nearest
of the ground, is called the line of
sistence. The pit or hole, made
ging the mine, is called the exca-

ire is communicated to the mine
pe or hose, made of coarse cloth,
diameter is about one inch and a
lled the saucisson (for the filling of
ear half a pound of powder is al-
o every foot), extending from the
r to the entrance of the gallery; to
of which is fixed a match, that
r who sets fire to it may have time
before it reaches the chamber.
event the powder from contracting
apness, the saucisson is laid in a
ough, called an auget, made of
three inches and a half broad,
o.ether lengthwise, with straw in
ound the saucisson, with a wood-
nailed upon it.
ies and chambers of mines.—The
made within the fortification, be
place is attacked, and from which
branches are carried to different
e from three to four feet or four
lf wide, and five feet or five and
gh. The earth is supported from
by arches and walls, or wooden
r props.
hamber is generally of a cubical
ge enough to hold the wooden
hich contains the powder. The
r is sunk something lower than
ry, if the soil permits; but where
to be apprehended it must be
gher than the gallery.
ties of powder to charge mines
ny calculation can be made of the
proper charge for a mine, the density and tenacity of the soil in which it is to be made must be ascertained, either by experiment or otherwise. The density is determined by weighing a cubic foot (or any certain quantity) of the soil; but the tenacity can only be determined by making a mine. The following table contains experiments in six different soils, which may be of some assistance to form a judgment of the nature of the soil, when an actual experiment cannot be had:

Nature of the soil.	Density.	Tenacity.
	Weight of 1 cubic foot.	Quantity of powder to raise 1 cub. fath.
1. Loose earth or sand	95 pds.	8 pds.
2. Common light soil	124	10
3. Loam, or strong soil	127	12½
4. Potter's clay, or stiff soil . .	135	13½
5. Clay, mixed with stones . .	160	16
6. Masonry . .	05	91½

Loading and stopping of mines.—The gallery and chamber being ready to be loaded, a strong box of wood is made of the size and figure of the chamber, being about one-third, or one-fourth bigger than is required for containing the necessary quantity of powder: against the sides and bottom of the box is put some straw; and this straw is covered over with empty sand bags, to prevent the powder from contracting any dampness; a hole is made in the side next the gallery, near the bottom, for the saucisson to pass through; which is fixed to the middle of the bottom, by means of a wooden peg, to prevent its loosening from the powder: or that, if the enemy should get to the entrance, he may not be able to tear it out. This done, the powder is brought in sand-bags, and thrown loose in the box, and covered also with straw and sand bags; upon this is put the cover of the box, pressed down very tight with strong props; and, to render them more secure, planks are also put above them, against the earth, and wedged in as fast as possible. This done, the vacant spaces between the props are filled up with stones and dung, and rammed in the strongest manner: the least neglect in this work will considerably alter the effect of the mine.

The auget is then laid from the chamber to the entrance of the gallery, with some straw at the bottom, and the saucisson laid in it, with straw over it: lastly it must be shut with a wooden cover nailed upon it. The gallery is stopped up with stones, earth, and dung, well rammed, six or seven feet further from the chamber than the length of the line of least resistance.

MINERAL WATERS. See Waters.

MINERALOGY, is that science which treats of the solid and inanimate materials of which our globe consists; and these are usually arranged under four classes: the earthy, the saline, the inflammable, and the metallic, which are thus distinguished:

1. The earthy minerals compose the greater part of the crust of the earth, and generally form a covering to the rest. They are not remarkable for being heavy, brittle, or light-coloured. They are little disposed to chrystallize, are uninflammable in a low temperature, insipid, and without much smell.

2. The saline minerals are commonly moderately heavy, soft, sapid, and possess some degree of transparency.

3. The inflammable class of minerals is light, brittle, mostly opaque, of a yellow, brown, or black colour, seldom chrystallize, and never feel cold.

4. Metallic minerals are characterized by being heavy, generally opaque, tough, malleable, cold, not easily inflamed, and by exhibiting a great variety of colours, of a peculiar lustre.

Under each of these classes are various genera, species, sub-species, and kinds, which will be noticed in order. Sometimes, as in the vegetable kingdom, we find a strict affinity between different species of minerals, and in that case they are said to belong to the same family; but in mineralogy, one class does not always blend with another in a chemical point of view, or furnish that beautiful gradation and almost imperceptible union which is to be traced in the other kingdoms of nature.

As the external characters are of the first importance in facilitating our acquaintance with minerals, we shall briefly explain this subject, before we proceed to the classification of the different substances.

Of the external characters of minerals.—The external characters of minerals are either generic or specific. The generic characters are certain properties of minerals, without any reference to their differences, as colour, lustre, weight, &c.; and the differences between these properties form the specific characters.

Generic characters may be general or particular. In the first division are comprehended those that occur in all minerals, in the last those that are found only in particular classes of minerals.

The particular generic external characters are thus advantageously arranged:

1. Colour.

2. Cohesion of particles distinguished into solid, friable and fluid.

In solid minerals are to be regarded the external shape, the external surface, and the external lustre. When broken, the lustre of the fracture, the fracture itself, and the shape of the fragments, are to be noticed. In distinct concretions, regard must be paid to the shape of the concretions, their surface, their lustre, transparency, streak and soiling. All these may be ascertained by the eye. By the touch, we may discover the hardness of minerals their tenacity, frangibility, flexibility, their unctuosity, coldness, weight, and their adhesion to the tongue. By the ear we distinguish their sound, and by the smell and taste the qualities which these two senses indicate.

In friable minerals, external shape, lustre, aspect of particles, soiling, and degree of friability, are to be attended to.

In fluid minerals the lustre, transparency, and fluidity, are principal objects to be regarded.

The specific external characters of minerals are founded on the distinction and varieties of the two great generic divisions. And first, of colours, the names of which are derived from certain bodies in which they most generally occur, either in a natural or artificial state, or from different mixtures and compositions of both.

I. Colour.

1. White. This may be snow-white, reddish-white, yellowish-white, silver-white, greyish-white, greenish-white, milk-white, or tin white.

2. Grey. Lead-grey, bluish-grey, pearl-grey, reddish-grey, smoke-grey, greenish-grey, yellowish-grey, steel-grey, and ash-grey.

3. Black. Greyish-black, brownish-black, dark-black, iron-black, greenish-black, and bluish-black.

4. Blue. Indigo-blue, Prussian-blue, lavender-blue, smalt-blue, sky-blue.

5. Green. Verdigris-green, celadine-green, mountain green, emerald-green, leek-green, apple-green, grass-green, pistachio-green, asparagus-green, olive-green, blackish green, canary green.

6. Yellow. Sulphur-yellow, lemon-yellow, gold-yellow, bell metal-yellow, straw-yellow, wine-yellow, isabella-yellow, ochre-yellow, orange-yellow, honey-yellow, wax-yellow, brass yellow.

7. Red. Morning-red, hyacinth-red, brick-red, scarlet-red, copper-red, blood-red, carmine-red, cochineal-red, crimson-red, columbine-red, flesh red, rose-red, peach-blossom red, cherry red, brownish red.

8. Brown. Reddish-brown, clove-brown, hair-brown, yellowish-brown, tombac-brown, wood-brown, liver-brown, blackish-brown.

Besides these distinctions, colours may be clear, dark, light, or pale; they may have a tarnished appearance, a play, a changeability, an iridescence, an opalescence, a permanent alteration, and a delineation of figure or pattern, such as dotted, spotted, clouded, flamed, striped, veined, dendritic, or uniform.

II. Cohesion of Particles.

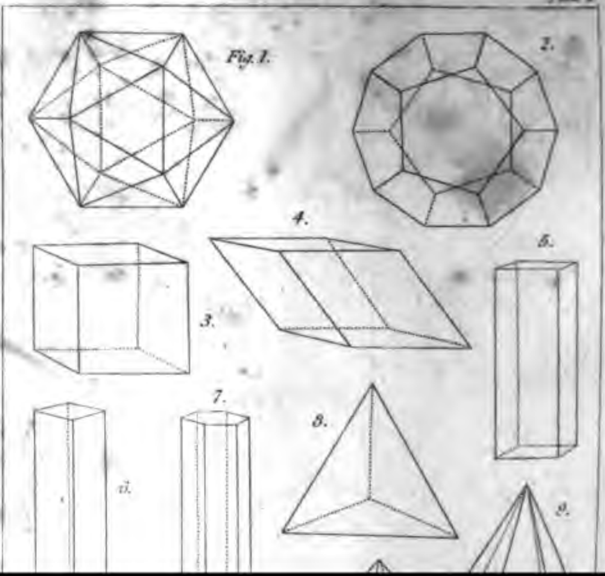
Minerals are divided into, 1. Solid, or such as have their parts coherent, and not easily movable; 2. Friable, or that state of aggregation in which the particles may be overcome by simple pressure of the finger; and, 3. Fluid, or such as consist of particles which alter their place in regard to each other by their own weight.

1. Solid Minerals.—External aspect has three things to be regarded, 1. The shape; 2. The surface; and 3. The lustre. The external shape again may be common, particular, regular, or extraneous; whence arise the specific differences.

1. The common external shape may be massive, disseminated coarsely, minutely

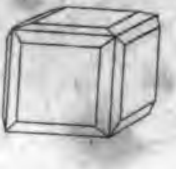
MINERALOGY.

Plate I.



MINERALOGY.

Plate II.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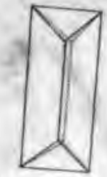
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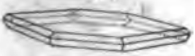
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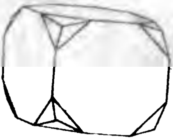
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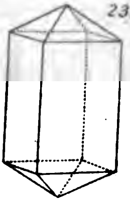
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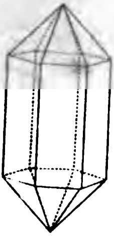
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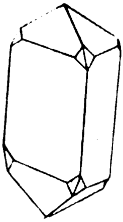
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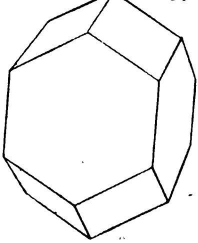
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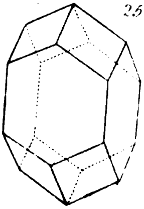
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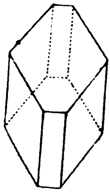
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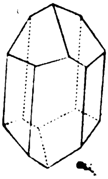
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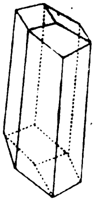
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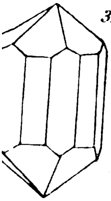
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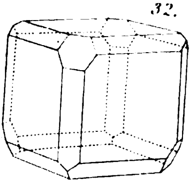
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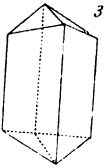
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Published June 1. 1810, by R. Phillips, Bridge Street Blackfriars, London.

Cooper sculp.

or finely; in angular pieces, sharp-cornered or blunt-cornered; in grains, large, coarse, small, fine, angular flat, round; in plates, thick or thin; in membranes or flakes, thick, thin, or very thin.

The particular external shape may be longish, as dentiform, filiform, capillary, reticulatic, dendritic, coralliform, stalactitic cylindrical, tubiform, claviform, or fruticose; roundish, as globular, spherical ovoidal, spheroidal, amygdaloidal, botryoidal, reniform, tuberose, or fused-like; flat, as specular, or in leaves; caverous, as cellular in various forms, with impressions, perforated, corroded, amorphous, or vesicular; entangled, as ramose, &c.

In the regular external shape or chrystallization are to be regarded its genuineness, according to which it may be either true or supposititious; its shape, made up of planes, edges, angles, in which are to be observed the fundamental figure and its parts, the kind of fundamental figure, the varieties of each kind of fundamental figure with their accidents and distinctions, and the alterations which the fundamental figure undergoes by truncation, by bevelment, by acumination, or by a division of the planes. There are a variety of figures under each of these subdivisions.

It must be remarked also that the external shape may be extraneous, or derived from the animal and vegetable kingdoms, as in fossils and petrifications.

2. The external surface contains several varieties of distinctions. It may be uneven, granulated, rough, smooth, or streaked in various ways and directions.

3. The external lustre is the third generic external character, and is of much importance to be attended to. In this we have to consider the intensity of the lustre, whether it is splendent, shining, glistening, glimmering, or dull; next the sort of lustre, whether metallic or common. The latter is distinguished into semimetallic, adamantine, pearly, resinous, and vitreous.

Aspect of the Fracture of solid Minerals.

After the external aspect, the fracture forms no inconsiderable character in minerals. Its lustre may be determined as in the external lustre: but the fracture itself admits of great varieties. It may be compact, splintery, coarsely splintery, finely splintery, even, conchoidal, uneven, earthly, hackly. If the fracture is fibrous, we are to consider the thickness of the fibres, if coarse or delicate the direction of the fibres, if straight or curved, and the position of the fibres, if parallel or diverging.

In the radiated fracture we are to regard the breadth of the rays, their direction, their position, their passage or cleavage. In the foliated fracture, the size of the folia, their degree of perfection, their direction, position, aspect of their surface, passage or cleavage, and the number of cleavages, are to be noted.

The shape of the fragments may also be very various, regular, as cubic, rhomboidal, trapezoidal, &c. or irregular, as cuneiform, splintery, tabular, indeterminately angular

Aspect of the distinct concretions.—The aspect of the distinct concretions forms very prominent external characters. They may be granular, different in shape, or in magnitude; they may be lamellar, distinct concretions, differing in the direction of the lamellæ, in the thickness, with regard to shape, and in the position.

The surface of the distinct concretions may be smooth, rough, streaked or uneven; as for their lustre, it may be determined in the same manner as the external lustre.

General aspect as to transparency.—Minerals, as is well known, have different degrees of transparency, which may be considered among their external characters. They may be transparent, semitransparent, translucent, translucent at the edges, or opaque.

The streak.—The colour of this external character may be either similar or different. It is presented to us when a mineral is scraped with the point of a knife: and is similar, when the powder that is formed is of the same colour with the mineral, as in chalk; or dissimilar or different, as in cinnabar, orpiment, &c.

The soiling or colouring—Is ascertained by taking any mineral substance between the fingers, or drawing it across some other body. It may soil strongly, as in chalk; slightly, as in molybdena; or not at all, which is a quality belonging to most of the solid minerals. All the preceding external characters are recognized by the eye.

External characters from the touch—These are eight in number, and are not destitute of utility to the mineralogical student. 1. Hardness; 2. Tenacity; 3. Frangibility; 4. Flexibility; 5. Adhesion to the tongue; 6. Unctuosity; 7. Coldness; 8. Weight.

Hardness may be tried by a capacity to resist the file, yielding a little to it, by being semi-hard, soft, or very soft. Tenacity has different degrees, in substances being brittle, sectile or mild, or ductile. The frangibility consists in minerals being very difficultly frangible, easily frangible, or very easily frangible. The flexibility is proved by being simply flexible, elasticly flexible, commonly flexible, or inflexible. The adhesion to the tongue may be strongly adhesive, pretty strongly, weakly, very weakly, or not at all. Unctuosity may be meagre, rather greasy, greasy, or very greasy. Coldness is subdivided into cold, pretty cold, rather cold. Weight may be distinguished into swimming or supernatant, light, rather light, heavy, very heavy. The three last divisions from the touch, are in the Wernerian system regarded as anomalous; but they seem properly to be classed under this head.

External characters from the sound or hearing.—The different kinds of sound which occur in the mineral kingdom are, 1. A ringing sound, as in native arsenic and thin splinters of horn-stone; 2. A grating sound as in fresh burnt clay; 3. A creeking sound, as that of natural amalgam.

2. Friable Minerals.—The external characters drawn from minerals of this class are derived, first, from the external shape, which may be massive, disseminated, thinly coating, spumous, or dentritic: secondly, from the lustre, regarded under

mercury; or viscid, as in mountain tar.

External Characters from the Smell.—These may be spontaneously emitted and described, as bituminous, faintly sulphurous, or faintly bitter; or they may be produced by breathing on, and yield a clay-like smell; or they may be excited by friction, and smell urinous, sulphureous, garlick-like, or empyreumatic.

External Character from the Taste—This character prevails chiefly in the saline class, and it contains the following varieties: a sweetish taste, sweetish astringent, styptic, salty bitter, salty cooling, alkaline, or urinous.

Having now given a synoptical view of the external characters of minerals, we shall proceed to their classification, and in this we shall chiefly follow the names and arrangement of professor Jameson.

CLASS I.—EARTHY FOSSILS.

Genus I. Diamond.

Diamond.—This precious stone has great variety of shades, exhibiting a beautiful play of colours. It occurs in indeterminately angular and completely spherical grains, which present planes of chrystallization, or are actually chrystallized. Its fundamental chrystal is the octaedron, which passes into various forms. It is hard in the highest degree, brittle, not very difficultly frangible, and has a specific gravity of 3.600.

The diamond has, by modern experiments, been proved to be nearly pure carbon, and begins to burn at 14 deg. or 15 deg. of Wedgewood. See plate I. Mineralogy, fig. 12.

Genus II. Zircon.

Species I.—Zircon; which see, and fig. 27.

Species II.—Hyacinth. The figure a rectangular four-sided prism, flatly acuminated by four planes, which are set in the lateral edges. Of this figure, however, several varieties occur.

The chrystals are generally small, and

rectangular four-sided
Internally, it is shi
tween glistening and
semitransparent, very
a low degree hard, an
heavy. It is nearly fus
tion. Occurs imbedde
Species 4.—Augite.—
is blackish green. It o
determinate angular p
grains. Occasionally
and presents broad rec
prisms. The chrystals
Internally the lustre is
ine sometimes to splen
The augite is only m
faintly transparent. It
easily frangible, and
heavy. It is found in
gis, or accompanied w
Species 5.—Vesuvian
colour is dark olive-g
other allied shades.
and often chrystallized
sided-prisms. The ch
short, and placed on on
The vesuviane is tra
moderate degree, and a
vy. Before the blowpi
addition. It is found a
Vesuvius, whence it
in Siberia and Kamtscha
Species 6.—Leucite.—
yellowish and greyish
mostly in original fo
grains. It exhibits ac
sided pyramids. Inter
and approaching to gl
treous lustre, inclining
nous.
The leucite is transluc
sparent. It is hard in a
tle, easily frangible, an
With borax, it forms a
rent glass. It is found in
est floetz trap formatio
basalt.

dish and angular grains;
hrystallized. Its lustre is
l vitreous. It is complete-
t, hard so as to scratch
und imbedded in Scotland in
ea shore. It is employed in
of jewellery, and is gene-
good foil.
—Grenatite.—The colour is a
brown. It is always chrystal-
l six-sided prisms. The chrys-
d middle sized, internally
th a lustre between vitreous
. It varies from opaque to
hard, brittle, easily frangi-
articularly heavy. It is found
mica slate.
—Spinelle.—The predomi-
s red, which passes on into
yellow, and brown. It oc-
s, and likewise chrystallized
a with several variations.
nd internally the lustre is
l vitreous. It is fusible with
ns in rocks belonging to the
trap formation. It is used
stone.
—Sapphire.—The principal
blue: but it is found also
intermediate shades of these
It occurs in small rolled
rystallized in double three-
ls.
ls are small and middle-si-
lly the lustre is splendent
Some varieties, when cut,
of six rays.
re is hard in the highest de-
ds to the diamond; it is easi-
pecific gravity of about 4.000.
without addition: occurs in
ewest floetz trap formation.
stone is found in the utmost
gu and Ceylon.
—Corundum.—Which see.
—Diamond spar.—The co-
rk hair-brown. It occurs
eminated, in rolled pieces,
zed in six-sided prisms, or
sided pyramids. Internal-
s splendent.
cent on the edges, hard in a
asily frangible.
rto been found only in Chi-
s stone and corundum are
cutting and polishing hard
l they seem to be nearly al-
ther.
—Emery.
—Topaz.—The chief colour
ow, of all degrees of inten-
und massive, disseminated,
s rolled, but most commonly
in oblique eight-sided or
sms, which exhibit several
he chrystals are small and
externally splendent; in-
ndent, and shining; lustre

alternates from translucent
, and is duplicating transpa-
rd in a high degree, easily
l is not particularly heavy.
th borax; and some kinds in
it turn white, and are some-
diamonds.
ly found in veins that tra-
re rocks.

Species 17.—Emerald, which see.

Species 18.—Beryl, which see.

Species 19.—Schorl—Divided into two sub-species, common schorl and tourmaline.

Species 20.—Thumerstone.—The colour is commonly clove-brown, of various degrees of intensity. It is occasionally found massive, more frequently disseminated: but generally chrystallized in very flat and oblique rhombs. Externally, its lustre is generally splendent: internally, it alternates from glistening to shining, and is vitreous. This species alternates from perfectly transparent to weakly translucent. It appears to be peculiar to the primitive mountains. See fig. 28.

Species 21.—Iron-Flint.—The colour a yellowish-brown, bordering on liver-brown. It occurs commonly massive, but also chrystallized in small equiangular six-sided prisms. Externally, its lustre is splendent, internally shining, and is intermediate between vitreous and resinous. It is opaque, and slightly translucent on the edges. It is pretty hard, somewhat difficultly frangible, and approaching to heavy. It occurs in ironstone veins, and renders the ore very difficult of fusion.

Species 22.—Quartz.—Werner divides this into five sub species: amethyst, rock-chrystal (fig. 24), milk-quartz, common quartz, and prase. See *Quartz*, *Amethyst*, &c.

Species 23.—Horn-Stone, which see.

Species 24.—Flint.—The general colour is grey, but with many varieties. It occurs massive, in regular plates, in angular grains, in globular and elliptical rolled pieces, in the form of sand, and tubercles and perforated. Sometimes it is chrystallized, when it exhibits double six-sided prisms, or flat double three-sided pyramids. Internally, the lustre is glimmering, translucent on the edges, hard, easily frangible, and not particularly heavy.

Species 25.—Chalcedony.—Divided into two sub-species, chalcedony and carnelian, which see.

Agate.—The fossils known under this name are all compound substances; and hence cannot have a particular place in any systematic arrangement. Werner therefore has placed them as a supplement to the species chalcedony, which forms a principal constituent part of them. See *Agate*

Species 26.—Heliotrope, which see.

Species 27.—Plasma.—The usual colour is intermediate between grass and leek-green, and of different degrees of intensity. It occurs in indeterminably angular pieces which have a rough earthy crust. Internally its lustre is glistening. It is intermediate between semi-transparent and strongly translucent, hard, brittle, frangible without great difficulty, and not particularly heavy.

Species 28.—Chrysopras.

Species 29.—Flinty Slate.—This has been divided into two sub-species, common flinty slate and Lydian stone.

Species 30.—Cat's eye.—The principal colour is grey, of which it presents many varieties. It occurs in blunt-edged pieces, in rolled pieces, and likewise massive.

Internally, it is shining; usually translucent, and sometimes also semi transparent. It is hard, easily frangible, and not particularly heavy. Its geognostic situation is unknown. It is imported from Ceylon and the coast of Malabar; and is usually cut for ring-stones. Some of the varieties are highly valued.

Species 31.—Prehnite.—The colours are various shades of green, white, and yellow. It is sometimes massive, and sometimes chrystallized in oblique four-sided tables. Externally, the chrystals are smooth and shining, internally, inclining to glistening and pearly. It is translucent, sometimes passing into semitransparent, and transparent: it is hard, easily frangible, and not very heavy.

Species 32.—Zeolite.—This species is divided into five sub species. 1. Mealy; 2. Fibrous; 3. Radiated; 4. Foliated; 5. Cubic-zeolite.

Species 33.—Cross-Stone. The colour is a greyish-white. It occurs chrystallized either in broad rectangular four-sided prisms, or in twin chrystals. Internal and external lustre is shining, inclining to splendent or glistening. The cross-stone is translucent, passing to transparent, semi-hard, easily frangible, and not particularly heavy. It has hitherto been found only in mineral veins, and in agate balls.

Species 34.—Agate-Stone.—The colour is a perfect azure blue, of different shades. It is found massive, disseminated, and in rolled pieces. The lustre is glistering and glimmering. It is translucent on the edges, pretty hard, brittle, easily frangible, and not particularly heavy. See *Agate*.

Genus IV.—Clay.

Species 1.—Jasper.
Species 2.—Opal.
Species 3.—Pitch Stone.
Species 4.—Obsidian.
Species 5.—Pearl Stone.
Species 6.—Pumice Stone.

Species 7.—Felspar.—Divided into four sub-species; compact felspar, common felspar, adularia, and Labradore stone. See fig. 29. Species 8.—Pure Clay.—Snow white, with occasionally a yellowish tinge, it occurs in kidney-shaped pieces, which have no lustre. It is opaque, soils very little, adheres slightly to the tongue, is light, and intermediate between soft and friable. Pure clay is found immediately under the soil, accompanied with foliated gypsum and selenite, at Halle, in Saxony, only.

Species 9.—Porcelain Earth.

Species 10.—Common Clay.—Divided into six sub species. 1. Loam. 2. Potter's clay is of two kinds, earthy and slaty. 3. Pipe clay. 4. Variegated clay, commonly white, red and yellow, striped, veined, and spotted. It occurs massive, is soft, passing into friable, feels a little greasy, and adheres somewhat to the tongue. 5. Clay-stone, commonly grey or red, with various intermediate tints. 6. Slate clay.

Species 11.—Polier, or polishing-Stone.
Species 12.—Tripoli.
Species 13.—Alum Stone.
Species 14.—Alum Earth.
Species 15.—Alum-Slate.
Species 16.—Bituminous Shale.

Species 17.—Drawing Slate or Black chalk. Its colour is a greyish-black, with a tinge of blue; it occurs massive, is opaque, colours and writes, is soft, and easily frangible, feels meagre but fine, and is rather light. It is found in primitive mountains in France, Germany, Ireland, Scotland, and the Hebrides. When of a middling degree of hardness, it is used for drawing.

Species 18.—Whet-Slate.
Species 19.—Clay-Slate.

Species 20.—Lepidolite.—Colour lilac or peach-blossom, it occurs massive. Internal lustre glimmering; it is translucent, soft, easily frangible, and easily melts before the blowpipe. Hitherto it has only been found in Moravia, where it lies in gneiss.

Species 21.—Mica or Glimmer. See fig. [illegible]
Species 22.—Pot-Stone.
Species 23.—Chlorite, which see.
Species 24.—Hornblende. See fig. [illegible]
Species 25.—Basalt.
Species 26.—Wacce.

Species 27. Clink-Stone—consists of a dark greenish-grey colour, massive, in regular columns, and tabular distinct concretions, usually translucent on the edges, brittle, easily frangible, and when struck with a hammer sounding like a piece of metal. It is said to belong to the Boetz trap formation, and generally rests on basalt.

Species 28.—Lava, divided into two sub-species, Slag-lava, and Foam-lava.

Species 29—Green Earth.—Its colour is a celadon green, of various degrees of intensity. It occurs massive, in crusts and globular pieces, and also disseminated. Internally it is dull, streak glistening, very soft, easily frangible, and light. It is principally found in amygdaloid, in Saxony, Bohemia, Scotland, and other places, and is used by painters.

Species 30.—Lithomarge, divided into two sub-species, Friable and indurated.

Species 31.—Rock Soap.

Species 32.—Yellow Earth.—To the clay genus, likewise, belong adhesive slate, float-stone, pinite, and umber.

Genus V.—Talc.

Species 1.—Bole.
Species 2.—Native Talc Earth.
Species 3.—Meerschaum.
Species 4.—Fuller's Earth.
Species 5.—Nephrite.
Species 6.—Steatite.
Species 7.—Serpentine, which see.
Species 8.—Schiller-Stone.
Species 9.—Talc.
Species 10.—Asbest. See *Asbestos*.
Species 11.—Cyanite, which see.
Species 12—Actynolite.

Is divided into the following sub-species:

1. Asbestous actynolite is of a greenish-grey colour occurs massive, disseminated, and in capillary chrystals; it is internally glistening, translucent on the edges, soft, brittle, not easily frangible, not particularly heavy. It is found in mineral beds in Saxony, and other parts of Germany.

2. Common actynolite is generally of a green leek-colour, passing into other shades of the same; it occurs massive, and likewise chrystallized in very oblique six-sided prisms, is splendent externally, semi-hard, rather brittle, and not easily frang-

ble. It is found in beds in primitive mountains, in Saxony, Switzerland, Norway, and Scotland.

5. Glassy actynolite is principally of a mountain green colour, of various degrees of intensity.

Genus VI.—Calc.

Species 1.—Rock Milk.

Species 2.—Chalk.—Its colour is principally a yellowish-white: it occurs massive, disseminated, and as crust over flint.

Species 3.—Lime-Stone, divided into several sub-species: viz. Compact, foliated lime-stone (see fig. 11.) Fibrous limestone, and Pea-stone.

Species 4.—Schaum, or foaming earth,

Species 5.—Slate spar.

Species 6.—Brown spar.

Species 7.—Rhomb spar. See *Spar*.

Species 8.—Schaalstone.

Species 9.—Stink-stone.

Species 10.—Marle.

Species 11.—Bituminous marle slate.

Its colour is intermediate between greyish and brownish-black; it is massive, from glimmering to shining, fragments slaty, usually soft, not very brittle, easily frangible, and streak shining. It is found in beds along with the oldest floetz limestone, and contains much copper intermixed with it, on account of which it is usually smelted in Thuringia.

Species 12.—Calc tuff. See *Tuff*.

Species 13.—Arragone.—The principal colours are greenish grey, and iron-grey. It occurs chrystallized in perfect equiangular six-sided prisms; the lustre is glistening, passing into shining, and is vitreous; it is semihard, brittle, not particularly heavy. It was first discovered in the province of Arragon, whence its name, imbedded in gyps.

Species 14.—Appatite.—The usual colours are white, green, blue, and red; it generally occurs chrystallized, the radical form of which is the equiangular six-sided prism. Externally it is splendent, internally shining and resinous. It is commonly transparent, semihard, brittle, easily frangible, and occurs in tin veins, &c. See fig. 20.

Species 15.—Asparagus or spargel stone. Fig. 31.

Species 16.—Boracite.—Its colours are yellowish, smoke and greyish white passing to asparagus-green; it occurs in chrystallized cubes, with the edges and angles truncated, internally shining, commonly semitransparent, semihard, brittle, and easily frangible. See fig. 32.

Species 17.—Fluor.—See fig. 19.

Species 18.—Gyps.—This is divided into the following sub-species.

1. Gyps earth is of a yellowish white colour, passing into some allied shades, is intermediate between fine scaly, and dusky, dull and feebly glimmering, soils a little, feels meagre but soft and fine, and is light. it is found, though rarely, in gyps countries. 2. Compact gyps, is commonly ash grey, passing into smoke and yellowish grey, is massive, internally dull, feebly transluce nt on the edges, very soft frangible without great difficulty, and is employed in architecture and sculpture, under the name of alabaster. 3. Foliated, gyps is commonly white, grey, or red, presenting spotted, striped, and veined colour delineations. 4 Fibrous gyps is principally white, grey, and red, with various shades of each. Gyps, when burnt, forms an excellent cement, and is used for many ornamental purposes.

Species 19.—Selenite.

Species 20.—Cube spar.

Genus VII.—Baryte.

Species 1.—Witherite.

Species 2.—Heavy spar or baryte. See *Baryte*.

Genus VIII.—Strontian.

Species 1.—Strontian.

Species 2.—Celestine.

Is divided into two sub species:

1. Fibrous celestine, is of an intermediate colour, between indigo blue and bluеish-grey; it occurs massive and in plates, and also chrystallized, shewing a tendency to prismatic distinct concretions; it is translucent, soft or semi-hard, easily frangible, and pretty heavy.

2 Foliated celestine, is of a milky-white colour falling into blue; it occurs massive, and also chrystallized in six-sided tables intersecting each other. It has a glistening lustre, is strongly translucent, softish, not particularly brittle, easily frangible, and hard. It occurs sometimes in sulphur beds, and is found very finely chrystallized in Sicily, and near Bristol. (Fig. 33.)

CLASS II.—*Fossil Salts.*

The substances included in this class are confined to those which are found in a natural state only; and the greater part of them appear to be formed by the agency of water, air, &c.

The distinguishing characters of fossil salts are, their taste and easy solution. They resemble each other so closely, that the term *saline consistence* is used to express whatever relates to hardness, tenacity, and frangibility.

Species 1 —Natron, or natural soda.

Species 2.—Natural nitre.

Species 3.—Natural rock-salt.

Species 4.—Natural sal ammoniac.

Species 5.—Natural Epsom salt.

Species 6.—Natural Glauber salt.

Species 7.—Natural alum.

Species 8.—Hair salt.

Species 9.—Rock butter. The colour is light yellow or greyish-white. It occurs massive and tuberose, is translucent, has a saline consistence, a sweetish-sour astringent taste, and feels a little greasy. It oozes out of fissures of rocks of alum slate, and is found in Lusatia, Thuringia, Denmark, Siberia, and near Paisley in Scotland.

Species 10.—Natural vitriol.—Divided into the sub-species: Iron—Copper—and Zinc vitriol.

Borax, though so well known by name is without a place in the Wernerian system, as it is uncertain whether or not it occurs in a solid state. It is most probable that it occurs only in solution in certain lakes. See *Borax*.

The new genus stallite, of which only one species, cryolite, has been found in Greenland, seems properly to come under this head.

Species 3.—Mineral charcoal.

The colour is a greyish-black. It occ in small angular and somewhat cubi shaped pieces, is glimmering, with a si lustre, soils strongly, is soft, and light. is found in thin layers in different ki of coal, and is widely disseminated.

Genus V.—Resin.

Species 1.—Amber.

Which is divided into the sub-specie 1. White. 2. Yellow amber.

Species 2. Honey-stone. Melite.

CLASS IV.—*Metallic Fossils.*

Genus I.—Platina.

pecie 1.—Native platina.

Genus II.—Gold.

Species 1.—Native gold.

Divided into three sub-species: 1. Gol yellow native gold. 2. Brass-yellow n tive gold. 3. Greyish-yellow native gul

Genus III.—Mercury.

Species 1.—Native mercury, or quic silver.

Species 2.—Natural amalgam.

Species 3.—Mercurial horn-ore, or co neous mercury.

Species 4.—Mercurial liver-ore, o mercurial hepatic ore.

Species 5.—Cinnabar.

Genus IV.—Silver.

Species 1.—Native silver.

Species 2.—Antimonial silver.

Species 3.—Arsenical silver.

Species 4.—Corneous silver-ore, o horn-ore.

Species 5.—Silver-black.

Species 6.—Silver-glance.

Species 7.—Brittle silver-glance.

Species 8.—Red silver-ore.

Species 9.—White silver-ore.

Species 10.—Black silver-ore. See *Silver.*

Genus V.—Copper.

Species 1.—Native copper.

Species 2.—Copper glance.

-Black iron-stone.
—Clay iron-stone. Reddle
rownish red, passing into a
It occurs only massive; soils
writes, is sectile, easily fran-
ither heavy. It is chiefly
newer clay-slate, in Ger-
seria. The coarser varieties
the carpenter, the finer by
nder the name of red chalk.
—Bog iron-ore.
—Blue iron-earth.
—Green iron-earth. Friable
rth is of a siskin-green colour
re and disseminated, is more
ing, soft, fine, easily frangi-
mediate between particular-
heavy.
-Cube ore.
enus VII.—Lead.
—Lead glance. Common
of a fresh lead-grey colour,
grees of intensity: it occurs
eminated, in membranes,
chrystallized in cubes, octa-
ur-sided prisms, six-sided
aree-sided tables. It is soft,
nerally easily frangible, and
heavy; and is found in
ds in primitive, transitive,
iountains. It is most fre-
ted as an ore of lead, but
an ore of silver.
Blue-lead ore.
-Brown-lead ore.
-Black-lead ore.
-White-lead ore.
-Green-lead ore.
-Red-lead ore.
-Yellow-red ore.
-Lead vitriol, or vitriol of

-Lead earth.
enus VIII.—Tin.
-Tin pyrites.
-Tin stone.
Cornish tin ore, or wood tin.
nus IX.—Bismuth.
-Native bismuth.
-Bismuth glance, of a light
our.
-Bismuth-ochre, of a straw
r passing into other neigh-
es.
ienus X.—Zinc.
Blende.
-Calamine.
us XI.—Antimony.
Native antimony.
Grey.
Black.
-Red.
White antimony ore.
-Antimony-ochre.
nus XII.—Cobalt.
White cobalt ore.
-Grey cobalt ore.
Cobalt glance.—The colour
-white, slightly inclining to
commonly massive and dis-
ometimes chrystallized in dif-
is externally splendent, in-
een shining and glistening,
tallic lustre. It is semihard,
very easily frangible; and
with steel, emits an arsenical
found in veins in various for-
he different mine countries of the continent of Europe; and from it the greatest part of the cobalt in commerce is obtained, which is highly useful in the manufacture of glass, and as a paint.

Species 4.—Black cobalt ore.
Species 5.—Brown cobalt ochre.
Species 6.—Yellow cobalt ochre.
Species 7.—Red cobalt ochre.

Genus XIII.—Nickel.

Species 1.—Copper nickel.
Species 2.—Nickel ochre.

Genus XIV.—Manganese.

The three species are,
Species 1.—Grey,
Species 2.—Black.
Species 3.—Red manganese ore.

Genus XV.—Molybdena.

Species 1.—Molybdena.

Genus XVI.—Arsenic.

Species 1.—Native arsenic.
Species 2.—Arsenic pyrites.
Species 3.—Orpiment.
Species 4.—Arsenic bloom.

Genus XVII.—Scheele.

Species 1.—Tungsten.
Species 2.—Wolfram.

Genus XVIII.—Menachine.

Species 1.—Menachanite.
Species 2.—Octrahedrite.
Species 3.—Rutile.
Species 4.—Nigrine.
Species 5.—Iserine.

Genus XIX.—Uran.

Species 1.—Pitch ore.
Species 2.—Uran mica.
Species 3.—Uran Ochre.

Genus XX.—Sylvan.

Species 1.—Native sylvan.
Species 2.—Graphic ore.
Species 3.—Yellow sylvan ore.
Species 4.—Black sylvan ore.

Genus XXI.—Chroma.

Species 1.—Acicular, or needle ore.—Its colour is dark steel-grey: occurs in imbedded acicular chrystals: internally shines with a metallic lustre, is soft, not very brittle, heavy, and is always accompanied with chrome ochre, and sometimes with native gold. It is found in Siberia.

Species 2.—Chrome Ochre.—Is of a verdigris green, passing through several neighbouring shades: it occurs massive, disseminated, and in membranes; is dull, soft, not very heavy, and is found with the preceding species.

Explanation of the Plates.

Fig. 1. The icosahedron. 2. The dodecahedron.—The hexahedron, 3. Cube. 4. Rhomb. Rectangular tetrahedral prism. 6. Oblique angular tetrahedral prism. 7. Equiangular hexahedral prism. 8. Tetrahedron, or simple three-sided pyramid. 9. Simple six-sided pyramid. 10. Double six-sided pyramid, in which the lateral planes of the one pyramid are set on the lateral planes of the other. 11. Double six-sided pyramid, in which the planes of the one pyramid are set obliquely on those of the other, so that the common base forms a zig-zag line. 12. Octahedron. 13. Rectangular four-sided table. 14. Common lens. 15. Oblique angular four-sided table 16. Cube truncated on all its angles 17. Cube truncated on all its edges. 18. Equiangular six-sided table. 19. The cube bevelled on all its edges. 20. Oblique-angufigures, its being performed with dots or points instead of lines; by the faintness of the colouring; and by its being usually done on vellum. See *Painting.*

MINIMUM, in the higher geometry, the least quantity attainable in a given case.

MINISTER, a person who preaches, performs religious worship in public, administers the sacraments, &c.

MINISTER *of state*, a person to whom a sovereign prince intrusts the administration of the government.

MINISTER, *foreign*, is a person sent into a foreign country to manage the affairs of his province, or of the state to which he belongs. Of these there are two kinds: those of the first rank are embassadors and envoys extraordinary, who represent the persons of their sovereigns. The ministers of the second rank are the ordinary residents.

MINIUM, in the arts, red lead and oxide of lead.

MINOR, in law, is an heir, either male or female, before they arrive at the age of twenty-one; during the minority of such they are usually incapable of acting for themselves.

MINOR, in logic, the second proposition of a regular syllogism.

MINOR, in music, signifies less, and is applied to certain concords or intervals which differ from others of the same denomination by half a tone: thus we say a third minor, meaning a less third; a sixth major and minor.

MINSTREL, in ancient customs, certain persons who combined the character of poet and musician, and whose profession it was to wander about the countries they inhabited, singing panegyrical songs and verses on their occasional benefactors accompanying them with some musical instrument.

MINT, the place in which the king's

gland ; stamens in
and glued to the ca
bular, covered with
of the inner calyx.
to the amaranthi
its farinaceous seed
its habit and double
ever, in many mark
assign it a place ; h
among the plants o
"Ordines Naturale
MIRROR, in ca
body impervious to
which reflects them
Mirrors were anc
but, at present, they
plates of glass, tinne
the back part, and
Mirrors are eith
concave. The fir
of light in a direct
that in which they
fore represents bo
magnitude. But t
the rays diverge m
reflection, and ther
the images of tho
exhibit; while the
lecting the rays into
nify the objects th
burn very fiercely
rays of the sun; a
monly known by
mirrors.
Some of the mor
phenomena of pla
low:
1. A spectator w
same size, and erec
right and left, and
culum as he is be
to or from the spec
at the same time,
the speculum also
like manner if, wh

ited without the angle. See

'ELLANEÆ, in botany, the name
fifty fourth order in Linnæus's
ments of a Natural method," con-
of plants, which not being con-
ogether by numerous relations, in
bit and structure, as the natural
, are assembled into one head un-
r general title of miscellaneous

HIEF. Malicious mischief is an
f such a gross nature, to personal
r, that although it is not done with
ax intention, or an intent to steal,
has inflicted punishment upon it
statutes. Of these are, statute
ry VII, c. 11. against destroying
ed bridges in the fens of Norfolk,
atute 43 Elizabeth, c. 13. setting
tacks of corn, &c. and imprison-
ns on the borders for the purpose
ing ransom. By 22 and 23 Charles
killing horses or cattle is felony;
ming sheep, &c. a trespass punish-
th treble damages. By statute 1
s.2 c. 9, captains and mariners
fire to ships is felony, and also
a hole in a ship in distress, &c. is
and death by statute 12 Anne, s.
. By statute 6 George I. c. 23, the
and maliciously tearing, cutting,
, or defacing, the garments of any
passing in the streets or highways,
ting, with intent to do so, is felony.
re are other acts which relate to
vention of setting fire to out-
with corn, damaging fish-ponds,
nted in gardens, cutting down sea-
hop-binds, setting fire to mines,
ting persons from buying corn,
fire to goss, furze, &c.; wilfully
engines in mines, fences in inclo-
reaking into houses of the Plate
ompany, with intent to destroy
s breaking into houses to cut or
cloth, serge, linen, &c. in the loom,
er similar offences.

HNA, or *Misna*, the code or col-
of the civil law of the Jews. The
retend, that when God gave the
law to Moses, he gave him also
r not written, which was preserved
ion among the doctors of the sy-
e, till rabbi Juda, surnamed the
seeing the danger they were in,
h their dispersion, or departing
he traditions of their fathers, re-
them to writing. The Misna is di-
into six parts: the first relates to
tinction of seeds in a field, to trees,
tythes, &c. The second regulates
anner of observing festivals: the
reats of women, and matrimonial
; the fourth of losses in trade. &c.
fth is on oblations, sacrifices, &c.
e sixth treats of the several sorts of
ation.

DEMESNOR, or MISDEMEANOUR,
e less than felony. The term com-
nds all indictable offences which are
an felony, as perjury, libels, &c.

LETOE. See *Viscum*.

NOMER, the using of one name for
er. Where a person is described so
may not be certainly distinguished
nown from other persons; the omis
or in some cases, the mistake of the
name shall not avoid a grant. But in actions and indictments, &c. the misnomer may be pleaded, and will abate the suit or indictment.

MISPICKEL, a native alloy of iron and arsenic. It may be made by fusion, it is white and brittle, and may be crystallized. Iron is capable of combining with more than its own weight of arsenic.

MISPRISION, is generally understood to be of all such high offences as are under the degree of capital, but bordering thereon, and it is said that a misprision is contained in every treason and felony whatsoever; and, that if the king please, the offender may be proceeded against for the misprison only. 4 Black. 119.

MISRECITAL, in deeds, is sometimes injurious, and sometimes not; if a thing be referred to time, place, and number, and that is mistaken, all is void.

MITCHELLA, a genus of the tetrandria monogynia class and order. Cor, one-petalled; stigmas 4; berry trifid, two seeded. There is one species, an herb of N. America.

MITE, a small coin formerly current, equal to about one third of a farthing.

It also denotes a small weight used by the moneyers. It is equal to the twentieth part of a grain, and divided into twenty-four doits.

MITE. See *Acarus*.

MITELLA, *bastard American sanicle*; a genus of the digynia order, in the decandria class of plants; nat. ord. succulentæ. Calyx quinquefid; corolla pentapetalous, and inserted into the calyx; petals pinnatifid; capsule unilocular and bivalved, with the valves equal. There are two species, both natives of North America.

MITHRIDATEA, a genus of the monandria monogynia class and order. Cal. four-cleft; cor. none; fruit, globular, depressed. There is one species, a tree of Madagascar.

MITRE, a sacerdotal ornament worn on the head by bishops, and certain abbots, on solemn occasions; being a sort of cap, pointed, and cleft at the top.

MITRE, in architecture, is the workman's term for an angle that is just forty-five degrees.

MITTIMUS, a writ by which records are transferred from one court to another. This word is also used for the precept directed to a gaoler, under the hand and seal of a justice of the peace, for the receiving and safe keeping a felon, or other offender, by him committed to gaol.

MIZEN, in the sea-language, is a particular mast or sail. The mizen-mast stands in the sternmost part of the ship. Its length is by some accounted the same with the height of the main-top mast, from the quarter deck; or half the length of the main-mast, and half as thick. The sail which belongs to the mizen-mast, is called the mizen-sail; and when the word mizen is used at sea, it always means the sail.

MNASIUM, a genus of the hexandria monogynia class and order. Cal. one-leaved, three-parted; cor. one-petalled, three-parted; antheræ four-cornered; germ three-lobed; stigmas three. There is one species, an aquatic of Guiana.

MNIARUM, a genus of the monandria digynia class and order. Cal. four-parted. superior; cor. none; seed one. There is one species, an herb of New Zealand.

MNIUM, in botany, a genus of the cryptogamia musci class and order. Nat. ord. of mosses: capsule with a lid; calyptre smooth; bristle from a terminating tubercle: male flowers headed, or discoid. M. hygrometricum is the most remarkable species. If the fruit stalk be moistened at the bottom, the head makes three or four turns; and if the head be moistened, it turns the contrary way.

MOAT, or DITCH, in fortification, a deep trench dug round the rampart of a fortified place. The brink next the rampart, is called the scarp; and the opposite one, the counterscarp. A dry moat round a large place, with a strong garrison, is preferable to one full of water, because the passage may be disputed inch by inch. In the middle of dry moats there is sometimes another small one, called a cunette; which is generally dug so deep, till they find water to fill it.

MODE, in logic, called also syllogistic mood, a proper disposition of the several propositions of a syllogism, in respect of quantity and quality.

MODE, in philosophy, denotes the manner of a thing's existence.

MODE, in music, a particular manner of constituting the octave; or, the melodious constitution of the octave, as it consists of seven essential sounds, besides the key or fundamental.

MODEL, in a general sense, an original pattern, proposed for any one to copy or imitate. This word is particularly used in building, for an artificial pattern made in wood, stone, plaister, or other matter, with all its parts and proportions, in order for the better conducting and executing some great work, and to give an idea of the effect it will have.

They also use models in painting and sculpture; whence, in the academies, they give the term model to a naked man or woman, disposed in several postures, to afford an opportunity to the scholars to design him in various views and attitudes.

Models in imitation of any natural or artificial substance, are most usually made by means of moulds composed of plaster of Paris.

When a model is to be taken, the surface of the original is first to be greased, in order to prevent the plaster from sticking to it. The original is then to be laid on a smooth table, previously greased, or covered with a cloth, to prevent the plaster sticking to it; then surround the original with a frame or ridge of glazier's putty, at such a distance from it as will admit the plaster to rest upon the table, on all sides of the subject for about an inch, or as much as is sufficient to give the proper degree of strength to the mould. A sufficient quantity of plaster is then to be poured as uniformly as possible over the whole substance, until it is every where covered to such a thickness as to give a proper substance to the mould, which may vary in proportion to the size. The whole must then be suffered to remain in this condition till the plaster has acquired its hardness: when the frame is taken away, the mould may be inverted, and the subject removed from it; and when the plaster is thoroughly dry, let it be well seasoned.

MODILLIONS, in architecture, ornaments in the cornichs of the Ionic, Corinthian, and Composite columns. They are little inverted consoles, or brackets, in form of an S, under the soffit of the cornice, seeming to support the projecture of the larmier, though in reality they are no more than ornaments.

MODULATION, in music, the art of conducting harmony, in composition, or extemporary performance, through those keys and modes which have a due relation to the fundamental, or original key.

MODULE, in architecture, a certain measure or bigness, taken at pleasure, for regulating the proportions of columns, and the symmetry or disposition of the whole building.

MODUS DECIMANDI, in law, is when money, land, or other valuable consideration, has been given, time out of mind, to the minister or parson of any certain place, in the room of tithes.

MOERHINGIA, mossy chickweed, a genus of the octandria digynia class of plants; flower composed of four distinct undivided petals; the fruit a subglobose capsule, with one cell, in which are contained numerous roundish seeds. There is one species.

MOHAIR, the hair of a kind of goat, frequent about Angora, in Turkey.

MOINEAU, in fortification, a flat bastion raised between two other bastions, when a re-entering angle before a curtain is too long.

MOISTURE, a term sometimes used to denote animal fluids, the juices of plants, or dampness of the air or other bodies.

MOLE. See *Talpa*.

MOLE-CRICKET. See *Gryllus*.

MOLLUGO, in botany, a genus of the triandria trigynia class and order. Nat. ord. caryophyllei. Calyx, five-leaved; corolla none; capsule three-celled, three-valved. There are six species, annuals of warm countries.

MOLLUSCA, in natural history, the second order of the Linnæan class vermes. They are naked; furnished with tentacula or arms; for the most part inhabitants of the sea; and by their phosphorescent quality, illuminate the dark abyss of the waters. This order comprised of simple animals furnished with limbs, is distinguished in the following way. A. mouth placed above: B. mouth placed beneath: C. mouth placed before: body with a lateral perforation: D. mouth before: body surrounded with feelers on the fore part: E. mouth before: body furnished with [illegible]: F. mouth before: body furnished with peduncles or feet: G. mouth placed beneath and generally central.

MOLOSSES, the thick fluid matter remaining after the sugar is made, resembling syrup.

MOLUCCELLA, a genus of the didynamia gymnospermia class of plants; flower monopetalous and labiated; the seeds are turbinated, and contained in the bottom of the cup. One annual species.

MOLYBDATES, in chemistry, salts
rmed from the molybdic acid, and the
rths, alkalies, &c. They are mostly
lourless, and soluble in water; they
ve a metallic taste. The prussiate of
ash throws down from several of them
ight brown coloured precipitate.

MOLYBDENUM, is a metal of a greyish
ite colour, in the form of brittle infus-
e grains. In colour it resembles lead,
t in the analysis was obtained sulphur,
d a whitish powder, which is a metallic
ide, and possesses the properties of an
id. Hitherto this metal is only obtained
grains, the greatest heat has not been
fficient to melt it into a button; its spe-
ic gravity is 7.4. When exposed to
at, in an open vessel, it gradually com-
nes with oxygen, and is converted into a
ite oxide, which is volatilized in small
lliant needle-form crystals. This oxide
ving the properties of an acid is called
molybdic acid.

Molybdenum is capable of combining
th four different proportions of oxygen
d of forming four oxides, the black, the
e, the green, and the yellow, or white.
the green is given the name of molyb-
s acid. It combines readily with sul-
ur, and in that state it is called molyb-
na, the sulphuret of molybdenum. This
y be formed by distilling together one
t of molybdic acid and five parts of
phur. Molybdenum will unite with many
the metals, forming with them alloys.

MOLYBDENA, or sulphuret of molyb-
num, occurs massive, disseminated, and
ely crystallized. Its colour is like that
fresh cut metallic lead. It occurs in
nular distinct concretions; it is opaque,
ins the fingers, leaves shining traces
en drawn over paper; it is very soft
d easily divisible in the direction of its
inæ. Specific gravity 4.5. to 4.7. It is
usible before the blow-pipe, but exhales
lphureous odour; at a very high heat,
elts, gives out white fumes and burns
h a blue flame. It is found in Nor-
y, Sweden, Saxony, and in Mont-Blanc
witzerland.

OLYBDIC } *acid.* See above. Mo-
OLYBDOUS } lybdic acid combines
alkalies, earths, and several metallic
es and forms molybdates, which see.
acid, combined with potash, forms a
urless salt: mixed with filings of tin
muriatic acid, it becomes blue, and
ipitates flakes of the same colour,
h disappear after some time. 100
s are composed of 67 molybdenum,
ygen.

OMENT, in the doctrine of time, an
nt, or the most minute and indivisi-
part of duration.

OMENT, in the doctrine of infinites,
tes the same with infinitesimal.

OMENTUM, in mechanics, signifies
ame with impetus, or the quantity of
on in a moving body; which is always
l to the quantity of matter, multiplied
the velocity; or, it may be considered
rectangle under the quantity of mat-
nd velocity.

OMORDICA, in botany, a genus of
monœcia syngenesia class and order.
ord. of cucurbitaceæ. Calyx five-
corolla five-parted; male filaments
e; female, style trifid; pome open-
ing elastically. There are eight species the most remarkable of which is the M. balsamina, common mordica or male balsam apple. This plant is famous in Syria for curing wounds; the inhabitants cut open the unripe fruit, and then infuse it in sweet oil, exposed to the sun for some days, until the oil is become red. It is applied to a fresh wound dropped on cotton; the Syrians esteem this next to balsam of Mecca.

MOMOTUS, a genus of birds of the order Picæ. Bill strong, slightly curved and serrated at the edges; nostrils feathered; tongue long, narrow and feathered at the edges; tail wedge-formed There is one species, M. brasiliensis, or the Brasilian motmot, is about eighteen inches long, and nearly of the size of a magpie. It is seen almost always alone, and on the ground, on which it makes its nest, in a hole deserted by some of the smaller quadrupeds. It lives principally upon insects, and abounds in the close woods of Brasil, Cayenne and Mexico. It is not valued either for its flesh or song.

MONADELPHIA, in botany, *a single brotherhood*: the name of the sixteenth class in Linnæus's system, consisting of plants with hermaphrodite flowers, (in which all the stamina, or male organs of generation, are united below into one body or cylinder, through which the pointal passes. See *Botany*.

MONANDRIA, in botany, the name of the first class in Linnæus's sexual system, consisting of plants with hermaphrodite flowers, which have only one stamen or male organ. This class is subdivided into two orders; *viz.* those that have one style, and those that have two.

MONARCHY, a government in which the supreme power is invested in a single person. There are several kinds of monarchies, as where the monarch is invested with an absolute power, and is accountable to none but God; or limited, where the supreme power is virtually in the laws, though the majesty of government and the administration is vested in a single person. Monarchies are also either hereditary, or elective, where the choice depends upon all who enjoy the benefit of freedom, or upon a few persons in whom the constitution vests the power of election. The dangers of monarchy are, tyranny, into which it is liable to degenerate, expence, exaction, military domination, unnecessary wars, waged to gratify the passions of an individual; risk of the character of the reigning prince; ignorance in the governors of the interests and accommodation of the people, and a consequent deficiency of salutary regulations; want of constancy and uniformity in the rules of government; and, proceeding from thence, insecurity of person and property. The advantages of this mode of government are, unanimity of council, activity, decision, secresy, dispatch; the military strength and energy which result from these qualities of government; the exclusion of popular and aristocratical contentions; the preventing by a known rule of succession, of all competitors for the supreme power; and thereby repressing the hopes, intrigues, and dangerous ambition of aspiring citizens. An hereditary monarchy is allowed to be decidedly better than one that is elective.

MONARDA, a genus of the diandria monogynia class and order. Nat. ord. of verticillatæ. Corolla irregular; the upper lip linear, involving the filaments; seeds four. There are seven species.

MONAS, in natural history, a genus of insects of the vermes infusoria class and order. Worm invisible to the naked eye, most simple, pellucid, resembling a point. There are five species. M. termo, a most minute, simple, gelatinous point, found in most animal and vegetable infusions; is of all known animals the most minute and simple, being so extremely delicate and transparent, as often to elude the most highly magnifying powers, blending as it were with the water in which it swims.

MONASTERY, a convent, or house built for the reception and entertainment of monks, mendicant friars, or nuns, whether it be an abbey, priory, &c.

MONETIA, a genus of the tetrandria monogynia class and order. Calyx four-cleft; petals four; berry two-celled; seeds solitary. There is one species, viz. M. barleroides, a native of the East Indies and the Cape of Good Hope.

MONEY, a substance, commonly metal, and generally of a determined shape and weight, to which public authority has affixed a certain value to serve as a medium in commerce. See also *Medal.* Money is usually divided into real or effective; and imaginary, or money of account. Real money includes all coins or species of gold, silver, copper, &c. which exist and have currency. Imaginary money, or money of account, is that which has never existed, or at least which does not exist in real specie, but is a denomination invented or retained to facilitate the stating of accounts, by keeping them still on a fixed footing, not to be changed like current coins. See *Pound*, &c.

No person is obliged to take in payment any money which is not lawful metal, that is, of silver and gold, except for sums under sixpence. 2 Inst. 577.

But it was decided in Hilary term, 1790, that bank notes were considered as money, and therefore a proper tender in payment.

English Money of Account, is the pound, shillings and pence; the pound contains twenty shillings, and the shilling twelve pence.

The old Scotch money of account was the pound, shilling, and penny; the pound containing twenty shillings, being equivalent to one shilling and eightpence English; and the shilling containing twelve pennies, equal to a penny English.

French money of account, sous, cents, &c.

Dutch Money of account. Accounts are kept at Amsterdam and Rotterdam, in guilders, stivers, and penins.

Spanish Money of account, at Cadiz in rials of plate and its fractions; at Castile, maravedies; at Valencia, livres or dollars, sueldos and dineros; of which last twelve make a sueldo, and twenty sueldos a livre or dollar. Seventeen quartos, at Cadiz and Castile, make two rials vellon. A maravedie is another imaginary specie, of which seventeen is reckoned to a rial vellon. The ducat is also a ficti
eleven rials of plate in purc
and other mercantile transact
in exchanges, when it is value
rials of plate and one marav
maravedies.

In Portugal, accounts are kep
res, making a separation at
dred thousandils, &c. 600 reas
dore.

German and Swiss Money of a
Coningsberg, Elbin, and Dantz
are kept in rixdollars and gro
lish guilders, gros, and deniers,
They exchange on Amsterdam
gros for a livre de gros of six gu
rent money of Amsterdam, an
burg for the rixdollar At Lube
are kept in marks, schellings, a
or penins-lubs, in which their
are made. At Breslau, accoun
in rixdollars and silver gros an
in the first of which species exc
made on Amsterdam for a cert
ber of stivers, bank money, and
burg for rix dollars of Breslau 2
dollars of Hamburg bank. At H
accounts are kept in marks,
and deniers-lubs bank money,
who have cash in the bank; but
who have not their books are
kept in rix dollars, schellings, an
current money. At Bremen acco
kept in rixdollars and gros, and
ges on Amsterdam rix-dollars of
gros for rixdollars of fifty stivers
Leipsic and Naumbourg, accou
kept in rixdollars, crowns, gros,
nins. At Berlin and in other parts
accounts are kept in guilders
nins. At Zurich, accounts are ke
dollars, creutzers, and hellers; re
their rixdollars (worth about
ling) at 108 of their creutzers. A
fort on the Maine, and Hanau,
are kept in rixdollars and creutz
Vienna, accounts are kept in
creutzers, and penins, reckon
penins to a creutzer, and sixty c
to a guilder. At Nuremberg an
bourg, accounts are kept in
creutzers, and hellers; at Liege,
sols, and deniers.

In the canton of St. Gall, in Sw
accounts are kept in guilders, c
and penins. In the canton
accounts are variously kept, som
dollars schellings, and deniers;
livres, schellings, and deniers; so
dollars creutzers, and penins; and
guilders, creutzers and penins.

Italian Money of account. In
of Genoa and Novi, accounts are
livres, soldi and denari; or in
100 soldis. At Milan, accounts
in livres, soldis and denari, to be
like pounds, shillings, and pe
twelve denaris to a soldi, &c.
accounts are kept in crowns, ju
bajoches, or grains and quart
crown is divided into ten julios,
julio into ten bajoches. At Leg
counts are generally kept in doll
and denari. At Florence, the
their books and accounts in crow
and denari, picoli or current mo
Naples, accounts are kept in du
vins, and grains. The accounts

taffic as at Naples. At Luc-
their accounts in crowns,
and denari; the crown is
10 soldi; the livre, 20 soldi;
12 denari. At Venice, ac-
pt in livres, soldi, and dena-
current; but the bank-cn-
res, soldi, and grosses; both
and bank-ducats of Venice
, or 6 livres and 4 soldi. At
ints are kept in livres, sol-
i; the livre being 20 soldi,
2 denari. At Bergamo, the
unt is the same as at Bolog-
proportions the same. At
s are kept in crowns, soldi,
the crown is 20 soldi, and
denari. At Modena and
ints are kept in livres, sol-
.. In Savoy and Piedmont,
kept in livres or lires, soldi,
. At Placentia, accounts
owns, soldi, and denari of
ch 12 denari make a soldi,
e crown. In Sardinia, ac-
pt as in most parts of Italy;
, and denari. In the island
oney of account is the same
ly. In the island of Cau-
nt is the same as at Ve-

edish, Danish, and Polish
nt. In the trading places
empire, accounts are kept
ves, and moscosques, or in
coppecks; 10 coppecks
is equal to two moscos-
grive, and 100 coppecks,
s a rouble. In the king-
, accounts are kept in dol-
d oorts: the dollar being
rks, and the mark 8 oorts.
ccounts are kept in marks
; the rixdollar is worth 6
rk 16 schellings; and the
nins. Accounts are kept
in other places in Norway,
ollars, marks, and schel-
nd, accounts are kept in
and deniers, of which 18
a gros, and 30 gros a
here keep accounts also
nd gros, reckoning 90 of
e of the former. At Riga,
ept in rixdollars and gros,
which species consists of

y of account. The Turks
, Asia, and Africa, account
ner of silver or gold (the
used in the seraglio), with
gold, called also rizes: the
s equal to 1500 French li-
65l. sterling; and the half
rtion: the purse of gold is
equal to 30,000 French
out 3,750*l.* sterling: this is
ut for presents to favou-
purse simply signifies a
or 1,500 livres. The mer-
Dutch dollars, called asta-
s, with medins and aspers:
ual to 35 medins, and the
rs; the asper to a halfpen-
ey.
r of account are as follow.
ccount by the taman (call-
d tumem) and *dinar-bisti*;

the taman is composed of 50 abassis, or 100 mamodies, or 200 chapes, or 10,000 dinars; which, accounting the abassi on the foot of 18 French sols, or the dinar on that of a denier, amounts to 3*l.* 12*s* 6*d.* sterling the raman. They also account by larins, especially at Ormus, and on the coast of the Persian gulph: the larin is equivalent to 11*d.* sterling; and on that footing is used also in Arabia, and through a great part of the East-Indies. Chinese monies of account are the pic, picol and tael; which though in effect weights, do likewise serve as money of account, obtaining in Tonquin as well as China: the pic is divided into 100 catis, some say 125, the cati into sixteen taels, each tael equal to one ounce two drachms: the picol contains 66⅔ datis; the tael is equivalent to 6*s.* 8*d.* sterling.

Japanese monies of account are the schuites, cockiens, ocbans or oubans, and taels: 200 schuites are equal to 500 Dutch pounds, the cockien equal to 10 Low-Country pounds, 1000 ocbans make 45,000 taels.

African Money of account. **From Cape Verd to the Cape of Good Hope, all exchanges and valuation of merchandises are made on the foot of the macoute and piece; which though no monies of account (for those barbarians have no real monies and therefore need no imaginary ones to estimate them by) yet serve in lieu thereof.** At Loango de Boirie, and other places on the coast of Angola, the estimations are made by macoutes; and at Malimbo and Cabindo, on the same coast, the negroes reckon by pieces; among the first the macoute is equal to ten pieces; ten macoutes make 100, which likewise gives us a kind of imaginary money to estimate any purchase, exchange, &c. The cities of Barbary and Egypt, whither the Europeans traffic, reckon much after the same manner as in the Levant and the dominions of the grand seignor.

Monies of account in America. Here the respective monies of account of the Europeans, who have made settlements there, are established. See *Exchange*.

MONEY, *bringing into court*. In some actions at law the defendant is allowed to pay a sum into court, which he contends is the fair amount of the plaintiff's just demand, and the plaintiff will afterwards proceed at his peril.

MONEYERS, officers of the mint, who work and coin gold and silver money, and answer all waste and charges.

MONKEY. See *Simia*.

MONNIERIA, in botany, a genus of the diadelphia pentandria class and order. Cal. five-parted, the upper segment long; cor. ringent; stamens two, the upper with two anthers, the lower with three; capsules five, one seeded. There is but one species, viz. M. trifolia.

MONOCHORD, in music, an instrument, or machine, so called because it is furnished with only one string. Its use is to measure and adjust the ratios of the intervals, which it effects by the means of moveable bridges, calculated to divide the chord at the pleasure of the performer.

MONOCULUS, in natural history, a genus of insects of the order aptera. Legs 4 to 8, formed for swimming, and very ced on the back. Some however are so large as to require no very minute inspection; and one species in particular, is of a size so gigantic, that it is generally considered as the largest of the crustaceous tribe. This animal is the monoculus polyphemus of Linnæus, commonly distinguished by the title molucca or king-crab. Specimens are sometimes seen of two feet in length, exclusive of the tail. It is a native of the Indian ocean, and is said to be generally found in pairs, or male and female swimming together. The eyes in this species, instead of being approximated, as required in the Linnæan generic character, are extremely distant from each other, being situated towards the sides of the shell: they are of a semilunar form, and the surface is divided into a great number of minute conical convexities: this part however should be considered as only constituting the cornea or exterior covering of each eye; the organs themselves being according to the observations of Mr. Petiver, in the Philosophical Transactions, placed on a pedicle beneath each of the above mentioned semilunar corneæ.

Monoculus pulex, called, from its peculiar starting or springing motion, the water-flea, is an almost universal inhabitant of stagnant waters, appearing sometimes in such vast swarms as to cause an apparent discoloration of the water itself. It is an insect of a highly singular and elegant appearance, exhibiting, when magnified, a beautiful distribution of internal organs. Its general length is about the tenth of an inch, but it is sometimes seen considerably larger: its shape is oval, somewhat truncated in front, and sharply pointed behind: the body is inclosed in a bivalve transparent shell, which, when examined by the microscope, appears finely reticulated: on each side the head is a strong transparent jointed arm, forking into two divisions, and terminating in several ceta-

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aw, is generally a lunar
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MONTIA, in botany, a genus of the triandria trigynia class and order. Natural ord. pontulaceæ. Calyx two-leaved; corolla one-petalled, irregular; capsule one celled, two-valved. There is but one species, viz. M. fontana, water chickweed.

MONTINIA, a genus of the dioecia tetrandria class and order. Nat. ord. of calycanthemæ. Calyx four-toothed, superior; petals four. Female filaments barren; style bifid; capsule oblong, two-celled. There is only one species, glaucus, a native of the Cape of Good Hope.

MONUMENT, in architecture, a building destined to preserve the memory, &c. of the person who raised it, or for whom it was raised; such as a triumphal arch, a mausoleum, a pyramid, &c.

MOOD. See *Mode*.

MOOD, or *Mode*, in grammar, the different manner of conjugating verbs, serving to denote the different affections of the mind.

MOON, *luna*, ☾, in astronomy, a satellite, or secondary planet, always attendant on our earth.

The motion of the moon in its orbit about the earth, is from west to east, and its orbit is found to be inclined to the ecliptic. The motion of the moon is also observed not to be uniform; being an ellipse, having the earth in one of the foci. The position of the ellipse is observed to be continually changing, the major axis not being fixed; moving sometimes direct and sometimes retrograde, but, upon the whole, the motion is direct, and it makes a complete revolution in a little more than eight years and a half. The excentricity of the ellipse is also found to change; that is, the ellipse is sometimes nearer to a circle than it is at other times. The inclination of its orbit is found likewise subject to a variation from 5 deg. to 5 deg. 18 min. All these irregularities arise from the sun disturbing the moon's motion by its attraction. As the ellipse which the moon describes about the sun, is subject to a variation, the periodic time of the moon about the earth will also vary; in winter, the moon's orbit is dilated, and the periodic time is increased; and in summer, her orbit is contracted, and her periodic time is diminished. The periodic time of the moon increases whilst the sun is moving from his apogee to his perigee, and decreases whilst he moves from his perigee to his apogee; and the greatest difference of the periodic times is found to be about twenty-two minutes and a half. The mean periodic time of the moon is 27 days 4 hours 43 min. 11 sec. 5; this is called her sidereal revolution, being the mean time from her leaving any fixed star, till her return to it again. It is found by observation that the mean time from her leaving her apogee till she returns to it, is 27 days, 13 hours, 18 min. 4 sec.; hence, the moon is longer in returning to her apogee than she is in making a revolution in her orbit; and therefore her apogee must move forward. The mean time from her leaving her node till she returns to it again, is 27 days, 5 hours, 5 min. 35 sec., 6, and this being less than her mean periodic time, it follows that she returns to her node be-

[illegible] from new moon to new moon will be sometimes greater and sometimes less than this.

When we view the moon with a telescope, we find that her surface is very rough with mountains and cavities; this appears from the very jagged boundary of the light and dark parts. Also, certain parts are found to project shadows always opposite to the sun; and when the sun becomes vertical to any of them, they are observed to have no shadow; these therefore must be mountains, few of which exceed half a mile in height. Other parts are always dark on that side next the sun, and illuminated on the opposite side; these therefore must be cavities. Hence the appearance of the moon constantly varies, from its altering its situation in respect to the sun.

The tops of the mountains on the dark part of the moon, are frequently seen separated at a distance from the confines of the illuminated part. The dark parts have, by some, been thought seas; and by others, to be only a great number of caverns and pits, the dark sides of which next to the sun, would cause those places to appear darker than the rest. Luminous spots supposed to be volcanoes have been discovered in the dark part of the moon.

Hevelius in his selenographia, or maps of the moon, has represented the appearance of the moon in its different states from the new to the full, and from the full to the new. Langrenus and Riccioli has denoted the spots upon the surface, by the names of philosophers, mathematicians, and other celebrated men; Hevelius marked them with the geographical names of places upon the earth. The former distinction is now generally used by astronomers.

Very nearly the same face of the moon is always turned towards the earth, it being subject to only a small change within-

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MORÆA, a genus of the triandria monogynia class and order. Nat. ord. ensatæ. Corolla six-petalled, the three inner parts spreading narrower; stigma trifid.

MORALITY, the science and doctrine of morals, otherwise called ethics.

MORAVIANS, *Herrnhutters*, or *United Brethren*, a denomination of Christians. Their episcopal, and their church government is conducted with great form and regularity. Questions of dispute are settled by ballot, and in cases of real or supposed importance are often decided by lot. The lot is deemed a solemn appeal to heaven, and is made use of with great seriousness. They have œconomies, or choir-houses, where they live together in community: the single men and single women apart, widows and widowers apart, each under superintendance of elderly persons of their own class. The Moravians are very strict in their attention to the youth of both sexes, and never suffer them to come together or marry without the previous consent of the church; and as the lot must be cast to sanction their union, each receives his partner as a divine appointment. In doctrine the Moravians appear to be inclined to Sabellianism. They address all their prayers to Jesus, or The Lamb. They reject the use of the term Trinity. In zeal, tempered with modesty, and in silent perseverance in attempting to convert the heathen world to Christianity, they are unequalled having formed for this purpose settlements in Greenland, America, the West Indies, the Cape of Good Hope, the East Indies, &c.

MORBID, among physicians, signifies diseased or corrupt, a term applied either to an unsound constitution, or to those parts or humours that are infected by a disease.

MORDANT, in dying. When a substance to be dyed has little or no attraction to the matter on which the colour depends, so as either not to be capable of abtracting it from its solvent, or of retaining it with such force as to form a permanent dye, then some intermediate substance is used, which acts as a bond of union between them: this substance is called a mordant.

MORDELLA, a genus of insects of the order coleoptera: antennæ moniliform or pectinate: head deflected under the neck, shells curved downwards towards the tip: at the base of the abdomen, and before the thighs, is a broad lamina. There are about thirty-four species.

MOREL, the phallus esculentus of Linnæus, a plant that grows on moist banks and wet pastures, and springs up in the early parts of spring.

MORINA, a genus of the diandria monogynia class and order. Nat. ord. of aggregatæ. Calyx of the fruit one-leafed, toothed; of the flower bifid; cor. irregular; seed one, under the calyx of the flower. There is but one species, viz. M. persica.

MORINDA, *Indian mulberry*, a genus of the pentandria monogynia class and order. Nat. ord. of aggregatæ. Flowers aggregate, one-petalled; stigma bifid; drupes aggregatæ. There are three species, natives of the East and West Indies.

MORISONIA, a genus of the monadelphia polyandria class and order. Nat. ord. of putamineæ. Cal. single bifid; petals four; pistillum one; berry with a hard rind, one-celled, many seeded, pedicelled. There is but one species, a tree of S. America.

MARMYRUS, a genus of fishes of the order Abdominales. Gen. char. snout protruded, mouth terminal; teeth numerous and notched; aperture of the gills without a cover; gill membrane with one ray; body scaly. There are nine species, mostly inhabitants of the river Nile.

MOROCCO, a fine kind of leather, prepared of the skin of an animal of the goat kind, and imported from the Levant, Barbary, &c.

The name was probably taken from the kingdom of Morocco, whence the manner of preparing it was borrowed, which is this: the skins being being first dried in the air, are steeped in clear water three days and nights; then stretched on a tanner's horse, beaten with a large knife and steeped afresh in water every day then they are thrown into a large vat in the ground full of water, where quick lime has been slaked, and there lie fifteen days, whence they are taken, and again returned every night and morning. Then they are thrown into a fresh vat of lime and water, and shifted night and morning for fifteen days longer; then rinsed in clear water, and the hair taken off on the leg with the knife, returned into a third vat, and shifted as before for eighteen days; steeped twelve hours in a river, taken out, rinsed put in pails, where they are pounded with wooden pestles, changing the water twice; then laid on the horse, and the flesh taken off; returned into pails of new water, taken out, and the hair side scraped; returned into fresh pails, taken out, and thrown into a pail of a particular form, having holes at bottom: here they are beaten for the space of an hour, and fresh water, poured on from time to time; then being stretched on the leg, and scraped on either side, they are returned into pails of fresh water, taken out, stretched, and sewed up all round in manner of bags, leaving out the hinder legs as an aperture for the conveyance of a certain mixture.

The skins thus sewed are put in lukewarm water, where dogs' excrement has been dissolved. Here they are stirred with long poles for half an hour, left at rest a dozen, taken out, rinsed in fresh water, and filled by a tunnel with a preparation of water and sumac, mixed and heated over the fire till ready to boil; and, as they are filled, the hind legs are sewed up to stop the passage. In this state they are let down into the vessel of water and sumac, and kept stirring for four hours successively; taken out and heaped on one another; after a little time their sides are changed; and thus they continue an hour and a half till drained. This done, they are loosened, and filled a second time with the same preparation sewed up again, and kept stirring two hours, piled up, and drained as before. This process is again repeated, with this difference, that they are now stirred only a quarter of an hour; after which they are left till next morning, when they are taken out, drained on a rack unsewed, the sumac taken out, folded in two from head to tail, the hair-side outwards, laid over each other on the leg, to perfect their draining, stretched out and dried; then trampled under foot by two and two, stretched on a wooden table, what flesh and sumac remains scraped off, the hair side rubbed over with oil, and that again with water.

They are then wrung with the hands, stretched, and pressed tight on the table with an iron instrument like that of a currier, the flesh side uppermost; then turned, and the hair side rubbed strongly over with a handful of rushes, to squeeze out as much of the oil remaining as possible. The first course of black is now laid on the hair side, by means of a lock of hair twisted and steeped in a black dye, prepared of sour beer, wherein pieces of old rusty iron have been thrown. When half dried by hanging in the air, they are stretched on a table, rubbed over with a paumelle, or wooden-toothed instrument, to raise the grain, over which is passed a light couche of water, then sleeked by rubbing them with rushes prepared for the purpose. Thus sleeked they have a second couche of black, then dried, laid on the table, rubbed over with a paumelle of cork, to raise the grain again, and, after a light couche of water, sleeked over anew; and, to raise the grain a third time, a paumelle of wood is used.

After the hair side has received all its preparations, the flesh side is pared with a sharp knife for the purpose; the hair side is strongly rubbed over with a woollen cap, having before it a gloss with barberries, citron or orange. The whole is finished by raising the grain slightly, for the last time, with the paumelle of cork; so that they are now fit for the market.

Manner of preparing red Morocco. After steeping, stretching, scraping, beating, and rinsing, as before, they are at length wrung, stretched on the leg, and passed after each other into water, where alum has been dissolved. Thus alumed, they are left to drain till morning, then wrung out, pulled on the leg, and folded from head to tail, the flesh inwards.

In this state they receive their first dye, by passing them after one another into a red liquor, prepared with lac, and some other ingredients, which the maroquineers keep a secret. This they repeat again and again, till the skins have got their first colour; then they are rinsed in clear water, stretched on the leg, and left to drain twelve hours; thrown into water, into which white galls pulverized have been passed through a sieve, and stirred incessantly for a day with long poles; taken out, hung on a bar across the water all night, white against red, and red against white, and in the morning the water stirred up, and the skins returned into it for twenty-four hours.

MOROXYLATES, in chemistry a genus of salts, of which there are two species, viz. 1. The moroxylate of lime found on the bark of mulberry-tree, crystallized in short needles. Its taste resembles succinic acid. When heated it swells and emits a vapour which irritates the organs of smell. Its solution precipitates acetate of lead, nitrate of silver and nitrate of mercury. 2. M. of ammonia, obtained by pouring carbonate of ammonia into the solution of the moroxylate of lime. This solution, when evaporated, yields crystals of moroxylate of ammonia in long slender prisms.

MOROXYLIC *acid*, discovered by Mr. Thompson on the bark of the morus alba or white mulberry, growing at Palermo in Sicily. It has the taste of succinic acid; is not altered by exposure to the air; and dissolves readily in water and alcohol. It does not precipitate the metallic solutions like its salt.

MORTALITY, *bills of*, registers of the number of deaths or burials in any parish or district. The London bills of mortality are founded upon the reports of the sworn searchers, who view the body after decease, and deliver their report to the parish clerk. The parish clerks are required under a penalty for neglect, to make a weekly return of burials, with age and disease of which the person died; a summary of which account is published weekly; and on the Thursday before Christmas-day, a general account is made up for the whole year. The total number of parishes now comprehended in the London bills of mortality is 146. They are divided into ninety seven parishes within the walls, sixteen parishes without the walls, twenty-three outparishes in Middlesex and Surry, and ten parishes in the city and liberties of Westminster. They give the ages at which the persons die, a list of the diseases and casualties by which their death was occasioned; but little dependance can be placed on the list of diseases, except with respect to some of the most common and determinate.

The following statement of the average of each five years from 1730, will shew a considerable decrease in the annual number of burials, and an increase of the christenings, which strongly indicates the progressive increase of the population of the metropolis; the proportion of annual deaths to 100 christenings likewise shews that they have approached so nearly to an equality that the population of London can now nearly support itself without an annual supply from the country.

5 Years ending	Burials	Christenings	Proportion to 100 Christen.
1735	25,490	17,517	145
1740	27,494	16,344	179
1745	25,350	14,419	175
1750	25,352	14,496	174
1755	21,080	15,119	139
1760	19,857	14,480	137
1765	23,992	15,834	151
1770	22,888	16,443	139
1775	22,147	17,284	[illegible]
1780	20,743	17,256	120
1785	18,880	17,333	109
1790	19,697	18,465	106
1795	20,298	18,800	107
1800	19,131	18,708	102

annual amount of burials, as irsuant to the population act, a satisfactory inference of d- ioriality in England since the the number of marriages and dicates that the existing popu- 01, was to that of 1780, as 117 e the amount of registered bu- ied stationary during the same will be seen in the following

ber of burials in England and Wales.

Males.	Females.	Total.
65,752 ...	66,976 ...	132,728
70,606 ...	69,702 ...	140,308
81,156 ...	79,268 ...	160,424
89,085 ...	87,408 ...	176,493
83,706 ...	83,267 ...	166,973
77,149 ...	77,537 ...	154,686
77,750 ...	77,887 ...	155,637
85,952 ...	88,431 ...	174,383
95,845 ...	95,891 ...	191,736
94,505 ...	94,867 ...	189,372
90,189 ...	90,725 ...	180,914
90,606 ...	91,383 ...	181,989
92,851 ...	95,070 ...	187,921
91,548 ...	93,922 ..	185,470
88,330 ...	90,728 ...	179,058
88,123 ...	90,595 ...	178,718
89,227 ...	92,118 ...	181,345
88,411 ...	90,973 ...	179,384
87,954 ...	90,777 ...	178,731
90,895 ...	89,557 ...	180,452
90,963 ...	91,646 ...	182,609
98,560 ...	98,305 ...	196,865
95,511 ...	95,638 ...	191,149
102,086 ...	101,242 ...	203,328
92,289 ...	92,245 ...	184,534
92,292 ...	92,637 ...	184,929
90,657 ...	90,656 ...	181,313
92,074 ...	91,189 ...	183,267
101,686 ...	99,442 ...	201,128

number of baptisms and of bu- he twenty-nine years above spe-

Males.	Females.	Total.
3,285,188...	3,150,922...	6,436,110
2,575,762...	2,590,082...	5,165,844

roportion of births therefore ap- be 104¼ males to 100 females; of hs 99¼ males to 100 females. The number of burials during the last ine years was about 156,000 per

r, a preparation of lime and sand p with water, which serves as a and is used by masons and brick- building of walls of stone and See *Lime*.

best mortar for resisting water is y mixing with lime, puzzolano, a sand brought from Italy. Basaltes substituted in its stead.

TAR, in chemistry and pharmacy, sil very useful for the division of y percussion, trituration, &c.

rs are of different shapes and si- l the matter intended to be broken is struck with a pestle made of ron, or marble, according to the it degrees of hardness.

TAR *piece*, a short piece of ordnance, considerably thick and wide; serving to throw bombs, carcasses, fire-pots, &c.

It was formerly the opinion of gunners, that only one certain charge of powder was requisite for each mortar, and that the horizontal range could not be altered but by changing the direction of the piece; but, at present, when a place lying in the same horizontal plane with the mortar, is to be bombarded, they elevate the piece to 45 deg. and augment or diminish the charge of powder until they ca- hit the mark.

For the same reasons, also, places lyin above or below the horizontal plane, passing through the piece, are bombarded by directing the mortar so as its axis may bisect the angle comprehended between a perpendicular to the horizon, at the point of projection, and a line drawn from that point to the mark aimed at; and then augmenting and diminishing the charge of powder until the object be hit.

In many cases, however other degrees of elevation are required. See *Projectiles*.

Mortars are most fit for service when hung by trunnions and propped with quoins, especially if their carriages be steady enough to prevent the effects of sudden recoiling.

In shooting with mortars, the following general rules should be always observed. 1. To measure the distance of the object aimed at. 2. That the bombs be of equal weight, otherwise the shots will vary. 3. That the carriage be on an exact level, to prevent its leaping. 4. That the powder with which the piece is charged, be always of the same strength and quantity. 5. That the charge be always equally rammed down. 6. That the wads be always of wood, tompions, or oakum. 7. That the fusees be fresh made the days on which they are to be used; and that they be of a composition proportionable to the range of the shot in the air, so that the bomb may break at the very moment of or soon after its fall; which composition must be such as not to be extinguished though it fall in water, but continue burning till the bomb breaks. See *Bomb*.

MORTGAGE, signifies a pawn of lands or tenements, or any thing immovable, laid or bound for money borrowed, to be the creditors for ever, if the money be not paid at the day agreed upon. Mortgages are either in fee, or for term of years, and the mortgagor was formerly considered as tenant at will to the mortgagee, but he is now considered to have no legal estate whatever in the land. The last and best improvement of mortgages is the mode now adopted, where the mortgage is made for a term of years, that the mortgagor if he has also the fee covenants to convey the fee to the mortgagor and his heirs, or any person whom he may appoint, in case of default in payment of the money. Although after breach of the condition, the estate is absolute at common law in the mortgagee, yet a right of redemption subsists in equity, which is called the equity of redemption, from the benefit of which the heir of the mortgagor cannot be excluded by any covenant, provided the original intent is to mortgage the estate, and not to sell it at first. This right goes to those who would have had the estate if it had not been incumbered. Although therefore the mortgage is forfeited, yet a court of equity will allow the mortgagor at any reasonable time, to recal or redeem the estate, paying the principal, interest, and costs. This however is not allowed if the mortgagee has been twenty years in possession. The heir at law may have the mortgage redeemed out of the personal assets in the first place, as far as they will extend. This privilege is also allowed to the person to whom land mortgaged is devised. Where a mortgagor conceals prior incumbrances upon making a second mortgage, he loses the equity of redemption.

MORTISE, or *Mortoise*, in carpentry, &c. a kind of joint, wherein a hole of a certain depth is made in a piece of timber, which is to receive another piece called a tenon.

MORTMAIN, signifies an alienation of lands and tenements, to any guild, corporation, or fraternity, and their successors, as bishops, parsons, vicars, &c. which may not be done without the king's licence, and the lord of the manor; or of the king alone, if it is immediately holden of him.

It is provided by stat. 9 G. II. c. 36, (called the statute of mortmain), that no manors, lands, tenements, rents, advowsons, or other hereditaments, corporeal, or incorporeal, whatsoever, nor any sum or sums of money, goods, chattels, stocks in the public funds, securities for money, or other personal estate whatsoever, to be laid out or disposed of in the purchase of any lands, tenements, or hereditaments, shall be given, limited, or appointed by will, to any person or persons, bodies politic or corporate, or otherwise, for any estate or interest whatsoever, or any ways charged or incumbered by any person or persons whatsoever, in trust, or for the benefit of any charitable use whatsoever; but such gift shall be by deed, indented, sealed and delivered in the presence of two or more credible witnesses, twelve calendar months at least before the death of such donor, and be inrolled in the high Court of Chancery, within six calendar mounths after execution, and the same to take effect immediately after the execution for the charitable use intended, and be without any power of revocation, reservation, on trust for benefit of the donor. And by the fourth section all gifts or incumbrances otherwise are made void.

MORUS, the *Mulberry tree*, a genus of the tetrandria order, in the monœcia class of plants; natural order scabridæ. Male calyx is quadripartite; no corolla: female calyx tetraphyllous; no corolla, two styles the calyx like a berry, with one seed. There are seven species, viz. 1. The nigra, or common black-fruited mulberry-tree, rises with an upright, large, rough trunk, dividing into a branchy and very spreading head, rising 20 feet high or more. 2. The alba, or white mulberry-tree, rises with an upright trunk, branching 20 or 30 feet high.

Considered as fruit-trees, the nigra is the only proper sort to cultivate here; the trees being not only the most plentiful bearers, but the fruit is larger and much finer-flavoured than that of the white kind.

Mulberry-trees are noted for their leaves affording the principal food of the silkworm. The leaves of the white species are preferred for this purpose in Europe; but in China, where the best silk is made, the worms are said to be fed with those of the morus tartarica. The advantages of white mulberry-trees are not confined to the nourishment of worms: they may be cut every three or four years like sallows and poplar trees, to make faggots; and the sheep eat their leaves in the winter, before they are burnt. This kind of food, of which they are extremely fond, is very nourishing; it gives a delicacy to the flesh, and a fineness and beauty to the wool.

The papyrifera, or paper-mulberry, is so called from the paper chiefly used by the Japanese being made of the bark of its branches. The leaves of this species also serve for food to the silkworm, and is now cultivated with success in France. It thrives best in sandy soils, grows faster than the common mulberry, and at the same time is not injured by the cold.

The tinctoria is a fine timber-tree, and a principal ingredient in most of our yellow dyes, for which it is chiefly imported into Europe.

MOSAIC, or *mosaic work*, an assemblage of little pieces of glass, marble, precious stones, &c. of various colours, cut square, and cemented on a ground of stucco, in such a manner as to imitate the colours of painting.

MOSCHUS, musk, a genus of quadrupeds of the order pecora: the generic character is, horns none; front teeth in the lower jaw eight; tusks solitary, in the upper jaw exserted.

1. Moschus moschiferus, Tibetian musk. The size and general appearance of this animal resemble those of a small roebuck. It measures about three feet three inches in length, about two feet three inches in height from the top of the shoulders to the bottom of the fore-feet, and two feet nine inches from the top of the haunches to the bottom of the hind feet. The upper jaw is considerably longer than the lower, and is furnished on each side with a curved tusk about two inches long. These tusks are of a different form from those of any other quadruped; being sharp-edged on their inner or lower side, so as to resemble, in some degree, a pair of small crooked knives: their substance is a kind of ivory, as in the tusks of the babyroussa and some other animals.

The general colour of the whole body is a kind of deep iron-grey; the tips of the hairs being of a ferruginous cast, the remainder blackish, growing much paler or whitish towards the roots.

The female is smaller than the male, and wants the tusks: it has also two small teats.

They are hunted for the sake of that well-known perfume: which is contained in an oval receptacle about the size of a small egg, hanging from the middle of the abdomen, and peculiar to the animal. This receptacle is found constantly filled with a soft, unctuous, brownish substance of the most powerful and penetrating smell; and which is no other than the perfume in its natural state. As soon as the animal is killed the hunters cut off the receptacle or musk-bag and tie it up ready for sale.

As musk is an expensive drug, it is frequently adulterated by various substances. As a medicine it is held in high estimation in the Eastern countries, and has now been introduced into pretty general use, especially in those disorders which are commonly termed nervous; and in convulsive and other cases, it is often exhibited in pretty large doses with great success.

2. Moschus Indicus, or the Indian musk. This species is rather larger than the common or Tibetian musk, of the colour mentioned in the specific character, with the head shaped like that of a horse, upright oblong ears, and slender legs.

3. Moschus pygmæus, or the pigmy musk, is considerably smaller than a domestic cat, measuring little more than nine inches from the nose to the tail. Its colour is bright bay, white beneath and on the insides of the thighs. Its shape is beautiful, and the legs are so slender as not to exceed the diameter of a swan-quill; the head is rather large, and the aspect mild. It is a native of many parts of the East Indies and the Indian islands, and is said to be most common in Java, where the natives catch great numbers in snares, and carry them to the markets in cages for sale. According to Mr. Pennant they may be purchased at so low a rate as two-pence halfpenny a piece. There are three other species.

MOSQUE, a temple or place of religious worship among the Mahometans. All mosques are square buildings, generally built with stone; before the chief gate there is a square court, paved with white marble, and low galleries round it, whose roof is supported by pillars. In these galleries the Turks wash themselves before they go into the mosque. In each mosque there are a great number of lamps. As it is not lawful to enter the mosque with shoes or stockings on, the pavements are covered with pieces of stuff sewed together, each wide enough to hold a row of men kneeling, sitting, or prostrate. The women are not allowed to enter the mosques. About every mosque there are six high towers, called minarets, each of which has three little open galleries, one above another: whence, instead of a bell, the people are called to prayer by certain officers appointed for that purpose. Most of the mosques have a kind of hospital belonging to them, in which travellers of what religion soever, are entertained during three days. Each mosque has also a place called tarbe, which is the burying-place of its founders; within which is a tomb six or seven feet long, covered with green velvet or satin, at the ends of which are two tapers, and round it several seats for those who read the koran, and pray for the souls of [illegible] deceased.

[illegible]OSS. See *Muscus*.

[illegible]OTACILLA, the *wagtail* and *warb*[illegible] genus of birds of the order of pas[illegible], distinguished by a straight weak [illegible]f a subulated figure, a tongue lace[illegible] at the end, and very slender legs.

The alba, or white wagtail, frequents the sides of ponds and small streams, and feeds on insects and worms. The head, back, and upper and lower side of the neck as far as the [illegible]st, are black; in some the chin is [illegible]e, and the throat marked with a bla[illegible]scent; the breast and belly are white[illegible]e tail is very long, and always in moti[illegible]

2. The flava, or [illegible]low wagtail, migrates in the nort[illegible] England, but in Hampshire continues the whole year. The male is a bird of great beauty; the breast, belly, thighs, and vent-feathers, being of a most vivid and lovely yellow. The colours of the female are far more obscure than those of the male: it wants also those black spots on the throat

3. The regulus, or gold-crested wren, is a native of Europe, and of the correspondent latitudes of Asia and America. It is the least of all the European birds, weighing only a single drachm. Its length is about four inches and a half, and the wings when spread out measure little more than six inches. On the top of its head is a beautiful orange-coloured spot, called its crest, which it can hide at pleasure.

4. The sutoria, or taylor-bird, is a native of the East Indies. It is remarkable for the art with which it makes its nest, seemingly in order to secure itself and its young, in the most perfect manner possible, against all danger from voracious animals. It picks up a dead leaf, and sews it to the side of a living one: its slender bill is the needle, and its thread is formed of some fine fibres; the lining is composed of feathers, gossamer, and down.

5. The lucinia, or nightingale, exceeds in size the hedge sparrow. The bill is brown; the irides are hazel; the head and back pale tawny, dashed with olive; the tail is of a deep tawny red; the under parts pale ash-colour, growing white towards the vent; the quills are cinereous brown. The male and female are very similar. This bird, the most famed of the feathered tribe for the variety, length, and sweetness of its notes, is supposed to be migratory.

The female builds in some low bush or quickset-hedge, well covered with foliage, for such only this bird frequents; and lays four or five eggs of a greenish brown. The nest is composed of dry leaves on the outside, mixed with grass and fibres, lined with hair or down within, though not always alike. The female alone sits on and hatches the eggs, while the male not far off regales her with his delightful song; but as soon as the young are hatched, he commonly leaves off singing, and joins with the female in the task of providing for and feeding them.

6. The modularis, or hedge-sparrow, a well-known bird, has the back and wing-coverts of a dusky hue, edged with reddish-brown; rump of a greenish-brown; throat and breast of a dull-ash-colour; the belly a dirty white; and the legs of a dull flesh-colour. The note of this bird would be thought pleasant, did it not remind us of the approach of winter.

7. The phœnicurus, or redstart, is somewhat less than the redbreast; the forehead is white; the crown of the head, hind part of the neck, and back, are deep blue-grey; the cheeks and throat black;

the breast, rump, and sides, red; and the belly is white; the two middle tail-feathers are brown; the rest red; and the legs are black. The wings are brown in both sexes. This bird is migratory; coming hither in spring, and departing in autumn about October. Their song has no great strength; yet it is agreeable enough; and they will, if taught young, imitate the notes of other birds, and sing by night frequently as well as in the day-time.

8. The rubecula, or redbreast, is universally known. It builds not far from the ground if in a bush; though sometimes it fixes on an out-house, or retired part of some old building. The nest is composed of dried leaves, mixed with hair and moss, and lined with feathers. The eggs are of a dusky white, marked with irregular reddish spots; and are from three to seven in number. Insects are their general food; but in defect of these they will eat many other things. No bird is so tame and familiar as this; closely attending the heels of the gardener when he is using his spade, for the sake of worms; and frequently in winter entering houses where windows are open, when they will pick up the crumbs from the table while the family is at dinner.

9. The œnanthe, or wheatear, is in length five inches and a half. The top of the head, hind part of the neck, and back, are of a blueish grey; and over the eye a streak of white; the under parts of the body yellowish-white: the breast is tinged with red; and the legs are black. This bird is met with in most parts of Europe, even as far as Greenland: and specimens have also been received from the East Indies. The young are hatched the middle of May. In some parts of England these birds are in vast plenty. About Eastbourn in Sussex they are taken in snares made of horsehair placed beneath a long turf. The numbers annually ensnared in that district alone amount to about 1840 dozen, which usually sell at sixpence per dozen. Quantities of these are eaten on the spot by the neighbouring inhabitants; others are picked, and sent up to the London poulterers; and many are potted, being as much esteemed in England as the ortolan on the continent. Their food is insects only; in rainy summers they feed much on earth worms, whence they are fattest in such seasons.

10. The cyanea, or superb warbler, a most beautiful species, is five inches and a half long. The bill is black; the feathers of the head are long, and stand erect like a full crest; from the forehead to the crown they are of a bright blue; thence to the nape, black like velvet; through the eyes from the bill there runs a line of black; and beneath the eye springs a tuft of the same blue feathers; beneath which, and on the chin, it is of a deep blue, almost black, and feeling like velvet. The hind part of the neck, and upper parts of the body and tail, are of a deep blue-black, the under pure white; the wings are dusky; the shafts of the quills chesnut; the legs are dusky brown; the claws black. It inhabits Van Diemen's Land, the most southern part of New Holland.

11. The troglodytes, or wren, is a very small species, in length only three inches and three quarters, though some have measured four inches. It generally carries the tail erect. This minute bird is found throughout Europe; and in England it defies our severest winters. Its song is much esteemed, being, though short, a pleasing warble, and much louder than could be expected from the size of the bird; it continues throughout the year.

The sylvia builds in low bushes, and lays five pale-green eggs, sprinkled with reddish spots.

Above 150 other species, besides varieties, are enumerated by ornithologists.

MOTE, in law-books, signifies court, meeting, or convention, as a ward-mote, burgh-mote, swain-mote, &c.

MOTH. See *Phalæna*.

MOTION, has been defined to be "a change of place," or the act by which a body corresponds with different parts of space at different times.

We are principally acquainted with two sorts of motion in the beings that surround us; one is the motion by which an entire body is transferred from one place to another, as that of a stone when it falls, or of a ship under sail. But, besides this, there is another kind of motion, which, though not so obvious, is yet not less common nor important. This is a motion of the parts of bodies among themselves, which though sometimes the object of our senses, yet in other cases we require the aid of reflection to be convinced of its existence. It is by this imperceptible motion that plants and animals grow, and by which the greatest number of the compositions and decompositions throughout the globe take place. The particles of the most solid bodies are also continually changing their situations. Heat expands, and cold contracts, the size of all bodies; now, we know from experience, that the temperature of bodies is constantly varying, consequently, the particles must be in continual agitation, in order to adapt themselves to the size of the body.

In considering motion, several circumstances must be attended to:

1. The force which impresses the motion. 2. The quantity of matter in the moving body. 3. The velocity and direction of the motion. 4. The space passed over by the moving body. 5. The time employed in going over this space. 6. The force with which it strikes another body that is opposed to it.

In a mechanical sense, every body, by its inertia, resists all change of state. If at rest, it will not begin to move of itself; and if motion is communicated to it by another body, it will continue to move for ever uniformly, except it is stopped by an external agent. It is true, we do not see any instances of bodies continuing to move for ever, after being once put in motion; but the reason of this is, that all the bodies which we see are acted upon in such a manner, as to have their motion gradually destroyed by friction, or the rubbing of other bodies upon them. For if you diminish the friction by any means, the motion will continue much longer; but as it is impossible to destroy it entirely, it diminishes, and at last destroys, as

son the surface of the earth. To
body in motion, therefore, there
: a sufficient cause. These causes
led motive powers, and the fol-
are those generally used in me-
: the action of men and other ani-
vind, water, gravity, the pressure
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elocity of motion is estimated by
e employed in moving over a cer-
ice, or by the space moved over in
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ust be divided by the time. For
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yards per minute. If we would
e the velocity of two bodies A and
hich A moves over 54 yards in 9
s, and B 96 yards in 6 minutes, the
y of A will be to that of B, in the
tion of 6 (the quotient of 54 divid-
9) to 16 (the quotient of 96 divided

now the space run over, the velo-
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e is increased, the space run over
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dy in motion must every instant
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nd always to the same point, in
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body is acted upon only by one
or by several in the same direction;
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ch the moving force acts; as the
of a boat which a man draws to him
rope. But if several powers, dif-
y directed, act upon it at the same
s it cannot obey them all, it will
n a direction somewhere between
This is what is called the compo-
nd resolution of motion, and is of
nost importance in mechanics.

ose a body A (Plate Miscel. fig. 1.)
cted upon by another body in the
on AB, while at the same time it is
ed by another in the direction AC,
will move in the direction AD; and
ines AB, AC, are made of lengths
tionate to the forces, and the lines
B, drawn parallel to them, so as to
ete the parallelogram ABDC, then
e which the body A will describe,
the diagonal AD; and the length
line will represent the force with
the body will move.

e know the effect which the joint
of two powers has upon a body, and
ce and direction of one of them, it
to find that of the other. For, sup-
AD to be the direction and force
which the body moves, and AB to
e of the impelling forces, then, by
eting the parallelogram, the other
AC is found.

nces in nature of motion produced
veral powers acting at the same
are innumerable. A ship impelled
wind and tide is one well known.
er kite, acted upon by the wind and
ing, is another.

on is said to be accelerated, if its
velocity continually increases; to be uniformly accelerated, if its velocity increases equally in equal times.

Motion is said to be retarded, if its velocity continually decreases; and to be uniformly retarded, if its velocity decreases equally in equal times.

If you suppose a body to be put in motion by a single impulse, and moving uniformly, to receive a new impulse in the same direction, i's velocity will be augment^e^d, and it will go on with the augmented velocity.

If at each instant of its motion it receives a new impulse, the velocity will qe continually increasing; and if this impulse is always equal, the velocity will be uniformlyaccelerated.

The regularly increasing velocity with which a body falls to the earth, is an instance of accelerated motion, which is caused by the constant action of gravity.

To illustrate the doctrine of accelerated motion, let us suppose, that, in the triangle ABC (Miscel. fig. 2), AB expresses the time which a body takes to fall, and BC the velocity acquired at the end of the fall. Let AB be divided into a number of equal parts, infinitely small, and from each of these divisions suppose lines, as DE, drawn parallel to BC. Those lines will express the velocities of the falling body in the several respective points of time, each being greater than the other, by a certain quantity of increase, which follows from the nature of the triangle. Now, the spaces described in the same time, are in proportion to the velocities; and the sum of the spaces described in all the small portions of time, is equal to the space described from the beginning of the fall. But the sum of all the lines parallel to BC, taken indefinitely near to each other, constitutes the area of the triangle. Therefore the space described by a falling body, in the time expressed by AB, with an uniformly accelerated velocity, of which the last degree is expressed by BC, will be represented by the area of the triangle ABC.

Let us now suppose that gravity ceased to act, and that the body moved during another portion of time, BF, equal to AB, with the acquired velocity represented by BC. As the space moved over is found by multiplying the velocity by the time, the rectangle CF will represent the space moved over in this second portion of time, which is twice the triangle ABC, and consequently twice the space is moved over with the accelerating velocity in the same time.

But if we suppose gravity still to act, besides the space CF, which it would have moved over by its acquired velocity, we must add the triangle CGH, for the effect of the constant action of gravity: therefore, in this second portion of time, the body moves over three times the space as in the first. In like manner, it may be easily seen by the figure, that in the next portion it would move over five times the space; in the next seven times, and so on, in arithmetical progression. And as the velocities of falling bodies are in proportion to the spaces run over, it follows, that, the velocities in each instant increase as the numbers 1, 3, 5, 7, 9, &c.

quires a velocity of twice that, or $32\frac{1}{6}$ feet in a second. At the end of the next second, it will have fallen $64\frac{1}{3}$ feet, the space being as the square of the time; the square of 2 is 4, and 4 times $16\frac{1}{12}$ is $64\frac{1}{3}$. By the same rule you may find, that in the third second it will fall 144 feet; in the next 256 feet, and so on. It is to be understood, however, that by this velocity is meant what bodies would acquire, if they were to fall through a space where there was no air; for its resistance considerably diminishes their velocity in falling.

It has been already shewn, that if two forces act uniformly upon a body, they will cause it to move in a straight line; but if one of the forces is not uniform, but either accelerating or retarding, the moving body will describe a curve line.

The force with which a body moves, or which it would exert upon another body opposed to it, is always in proportion to its velocity multiplied by its weight, or quantity of matter. This force is called the momentum of the body: for if two equal bodies move with different velocities, it is evident that their forces or momenta are as their velocities, and if two bodies move with the same velocity, their momenta are as the quantities of matter; therefore, in all cases their momenta must be as the products of their quantities of matter, and their velocities. This rule is the foundation of mechanics.

In consequence of the vis inertiæ of matter, all motion produced by one force only acting upon a body, must be rectilinear; for it must receive some particular direction from the power that impressed it, and must retain that direction until it is changed by some other power. Whenever, therefore, we see a body moving in a curvilinear direction, we may be

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position. If the centr
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connected by the righ
tances AC and BC,
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weights of the bodies
AC : BC : : B : A.

If a line is drawn
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The broader the ba
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is placed, were eleva
would slide down up
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but it would tumble
that line falls withou
the body E, (fig. 5)
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and where the two lines meet must be the centre of gravity; for the centre of gravity being in each line, it must be at the point where they intersect.

MOTION, *spontaneous* or *muscular*, is that performed by the muscles at the command of the will.

MOTION, *natural* or *involuntary*, that effected without any such command, by the mere mechanism of the parts, such as the motion of the heart, pulse, &c.

MOTION, *intestine*, the agitation of the particles of which a body consists.

MOTION, in music, the manner of beating the measure, to hasten or slacken the time of the words or notes.

MOVEABLE, in general, denotes any thing capable of being moved. The moveable feasts are such as are not regularly held on the same day of the year or month, though they are always on the same day of the week. Thus Easter, on which all the rest depend, is held on the Sunday which falls upon, or next after, the first full moon following the 21st of March.

MOVEMENT, in mechanics, a machine that is moved by clock-work. See *Clock*.

MOVEMENT, in military affairs. Under this term are comprehended all the different evolutions, marches, countermarches, and manœuvres, which are made in tactics for the purpose of retreating from, or of approaching towards an enemy. It also includes the various dispositions which take place in pitching a camp, or arranging a line of battle.

MOVEMENT, in music, the name given to any single strain, or to any part of a composition comprehended under the same measure or time.

MOVING *plant*. See *Hedysarum*.

MOULD, or *Mold*, in the mechanic arts, &c. a cavity cut with a design to give its form or impression to some softer matter applied therein, of great use in sculpture, foundery, &c.

MOULDS, in the manufacture of paper, are little frames composed of several brass or iron wires, fastened together by another wire still finer. Each mould is of the bigness of the sheet of paper to be made, and has a rim or ledge of wood to which the wires are fastened; these moulds are more usually called frames or forms.

MOULDS *for leaden bullets*, are little iron pincers, each of whose branches terminates in an hemispherical concavity, which when shut, form an entire sphere; in the lips or sides where the branches meet, is a little jet or hole through which the melted lead is conveyed.

MOULDS, *glazier's*. The glaziers have two kinds of moulds, both serving to cast their lead. In the one they cast the lead into long rods or canes fit to be drawn through the vice, and the grooves formed therein, this they sometimes call ingot-mould. In the other they mould those little pieces of lead a line thick, and two
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MOULDS, used in basket-making, are very simple, consisting ordinarily of a willow or osier, turned or bent into an oval, circle, square, or other figure, according to the baskets, panniers, hampers, hats, and other utensils intended. On these moulds they make or more properly measure all their work, and accordingly they have them of all sizes shapes, &c.

MOULDS, among tallow-chandlers, are of two kinds; the first for the common dipped candles, being the vessel wherein the melted tallow is disposed, and the wick dipped; this is of wood, of a triangular form, and supported on one of its angles, so that it has an opening of near a foot at top; the other, used in the fabric of mould candles, is of brass, pewter, or tin; here each candle has its several moulds.

MOULD, among gold-beaters, a certain number of leaves of vellum, or pieces of guts, cut square, of a certain size, and laid over one another, between which they put the leaves of gold and silver, which they beat on the marble with the hammer. They have four kinds of moulds, two whereof are of vellum, and two of gut; the smallest of those of vellum consists of forty or fifty leaves, the largest contains an hundred; for the others, each contains five hundred leaves. The moulds have all their several cases, consisting of two pieces of parchment, serving to keep the leaves of the mould in their place, and prevent their being disordered in beating.

MOULD, in agriculture, a loose kind of earth, every where obvious on the surface of the ground, called also natural or mother-earth, by some also loam.

MOULDINESS, a term applied to bodies which corrupt in the air, from some hidden principle of humidity therein; and whose corruption shews itself by a certain white down, or lanugo, on their surface, which viewed through a microscope, appears like a kind of meadow, out of which arise herbs and flowers, some only in the bud, others full blown, and others decayed, each having its root, stalk, and other parts. See *Mucor*.

MOULDING, any thing cast in a mould, or that seems to have been so, though in reality it were cut with a chissel or the ax.

MOULDINGS, in architecture, projectures beyond the naked wall, column, wainscot, &c.

MOUNTAINS. Elevations consisting chiefly of clay, sand, or gravel, are called hills. Those which consist chiefly of stone are called mountains. Mountains are divided into primæval, that is, of equal date with the formation of the globe, and secondary or alluvial. Among primæval, those of granite hold the first place. The highest mountains and most extensive ridges throughout the globe are of that kind. The highest of them never contain metallic ores; but some of the lower contain ores of copper and tin. The granite next the ore always abounds in mica. Petrifactions are never found in these primæval mountains.

That the formation of these mountains preceded that of vegetables and animals, is justly inferred from their containing no organic remains, either in the form of petrifaction or impression. Naturalists are agreed, that granites were formed by crystallization. This operation probably took place after the formation of the atmosphere, and the gradual excavation of the bed of the ocean, when the dry land appeared.

For, by means of the separation of the aeriform fluids which constitute the atmosphere, the evaporation of part of the water into the atmosphere, and the gradual retreat of the remainder, the various species of earths, before dissolved or diffused through this mighty mass, were disposed to coalesce; and among these the siliceous must have been the first, as it is the least soluble; but as the siliceous earth has an affinity to the other earths with which it was mixed, some of these must have united in various proportions, and thus have formed, in distinct masses, the feltspar, schorl, and mica, which compose the granite.

Calcareous earth enters very sparingly into the composition of this stone; but as it is found in schorl, which is frequently a component part of granite, it follows that it must be one of the primitive earths, and not entirely derived from marine exuviæ, as some have supposed. Quartz can never be supposed to be a product of fire; for in a very low heat it bursts, cracks, and loses its transparency, and in the highest degree of heat that we can produce, is infusible, so that in every essential point it is different from glass, to which some have compared it. As granite contains earths of every genus, we may conclude, that all the simple earths are original.

Mountains which consist of limestone or marbles of a granular or scaly texture, and not disposed in strata, seem also to have preceded the creation of animals, for no organic traces are found in them. Some of those which consist of argillaceous stones, and some of the siliceous, contain also no organic remains.

Alluvial mountains are evidently of posterior formation, as they contain petrifactions and other vestiges of organic substances; and these are always stratified.

Mountains, as to structure, are entire, stratified, and confused. Entire mountains are formed of huge masses of stone, without any regular fissures, and are mostly homogeneous.

The stratified mountains are those whose mass is regularly divided by joints or fissures: these are called horizontal, rising, or dipping. Homogeneous stratified mountains consist chiefly of stones of the argillaceous genus, or of the fissile compound species of the siliceous genus, as metallic rock; sometimes of limestone of a granular or scaly texture, in which no animal vestiges appear. This limestone reposes on the argillaceous or siliceous strata; sometimes the argillaceous are covered with masses of granite, sometimes of lava. These mountains, particularly those of gneiss, metallic rock, and horn-stone, are the chief seat of metallic ores.

Heterogeneous, or compound stratified mountains, consist of alternate strata of various species of stones, earths, sands, &c. The limestone here is always of the laminar, and not of the granular or scaly kind; and when it contains any ore, it is placed between its laminæ. Coal, bitumen, petrifactions, and organic impressions, are found in these mountains; also salts and calamine.

There are other mountains which cannot properly be called stratified, as they consist only of three immense masses; the lowest granite, the middle argillaceous, and the upper limestone. Metallic ores are found in the argillaceous part, or between it and the limestone.

Confused mountains consist of stones heaped together without order, their interstices filled with clay, sand, and [illegible]. They scarcely ever contain any ore.

Besides these, there are many mountains in different parts of the world, which derive their origin from volcanoes.

The height of mountains is usually calculated by means of the barometer. The highest mountains are those which are situated at or near the equator; and the Andes are generally allowed to be the highest of these. The line of congelation, or of perpetual frost, on mountains, is calculated at 15,400 feet, at or near the equator; at the entrance of the temperate zone, at 13,428; at Teneriffe, at [illegible]; in Auvergne (lat. 45) 6,740; with us (lat. 52), 5,740. On the Andes, vegetation ceases at 14,457 feet; and on the Alps at 9,585. The air is so dry in these elevated situations, that M. d'Arcet observed that on the Pic de Midi, one of the Pyrenees, salt of tartar remained dry for an hour and a half, though it immediately moistened in the same temperature at the bottom of the mountain.

MOUNTING, in military affairs, signifies going upon duty. Thus, mounting the breach is running up to it; mounting the guard, is going upon guard; and mounting the trenches, is going upon duty in the trenches; but mounting a cannon, mortar, &c. is the setting it on its carriage, or the raising its mouth.

MOUSE. See *Mus.*

MOUTH, in anatomy, a part of the face, consisting of the lips, the gums, the insides of the cheeks, the palate, the salival glands, the os hyoides, the uvula, and the tonsils. See *Anatomy.*

MUCILAGE, a glutinous matter obtained from vegetables, transparent and tasteless, soluble in water, but not in spirit of wine. It chiefly consists of carbon, hydrogen, and a small quantity of oxygen. See *Gluten.*

MUCILAGINOUS GLANDS. See *Anatomy.*

MUCOR, in botany, a genus of the order fungi, in the cryptogamia class of plants. The fungus has vesicular heads supported by foot stalks. There are seventeen British species. The lichenoides, or little black, pin-headed mucor, grows in groups near to each other, in chasms of the bark of old trees, and upon old park-pales.

The mucedo, or common grey mould, grows on bread, fruit, plants and other substances, in a putrid state. It grows in clusters; the stalks a quarter of an inch high, pellucid, hollow, and cy[illegible]

ng each in a single globular head,
ansparent, afterwards dark-grey;
arsts with elastic force, and ejects
und seeds discoverable by the
pe. The septicus or yellow fro-
or, is found on the leaves of
uch as ivy and beech, &c. some-
on dry sticks, and frequently upon
r bark in hot-houses. It is of no
ize or figure, but of a fine yellow
nd a substance at first resembling
eaten up into froth. In the space
urs it acquires a thin filmy coat,
dry, and full of sooty powder ad-
downy threads.

US ACID. See *Saclactic Acid.*

US GLAND. See *Anatomy.*

S, a fluid secreted by certain
nd serving to lubricate many of
nal cavities of the body. In its
tate it is generally limpid and co-
; but from certain causes, will of-
ne a thick consistence and whi-
r like pus.

sulphuric acid and water, dilu-
uric acid, and caustic alkaline
and water, will serve to distin-
s from mucus; the vitriolic acid
it from coagulable lymph and
lixivium from serum. Hence,
rson has any expectorated mat-
composition of which he wishes
n, let him dissolve it in vitriolic
in caustic alkaline lixivium;
m add pure water to both solu-
there is a fair precipitation in
may be assured that some pus is
But if there is a precipitation in
t is a certain test that the mix-
tirely mucus. If the matter can-
le to dissolve in alkaline lixivi-
he and trituration, we have also
believe that it is pus.

S, *Nasal*: this name is given to a
ich secreted in the cavities of the
s discharged outwardly, either by
ls in the form of drops, or in that
more or less thick; or by the fau-
it descends by the posterior part
al cavities, in which it is thrown
itting. The nasal mucus is at
d, clear and limpid, a little viscid
sive, without smell, of a saline
taste. This liquid, being al-
osed to the air, which continually
rough the nostrils, is constantly
ore viscid, and more adhesive,
ears; and the carbonate of soda
ontains, whilst the latter contains
, announces that the air deposits
art of the carbonic acid which it
especially as it is expired out of
. When it becomes thick in the
uently assumes in it the form of
y, brilliant, and, as it were, mi-
plates. The nasal mucus experi-
o real petrifaction in the air,
es not dissolve it. Acids thicken
they are concentrated and employ
nall proportions; but when we
ger quantity, they redissolve and
ifferent shades of colour. The
the nostrils maintains the soft-
e membranaceous sides of the
vities. It moderates the too great
ty of the nervous papillæ; stops
the odorous bodies, and blunts
great activity. It likewise purifies the air that is respired, by taking from it the pulverulent particles which it carries along with it, and which would be more hurtful in the lungs.

MUFFLE, in metallurgy, an arched cover, resisting the strongest fire, and made to be placed over coppels and tests in the operations of assaying, to preserve them from the falling of coals and ashes into them; though, at the same time, of such a form, as is no hindrance to the action of of the air and fire on the metal nor to the inspection of the assayer.

MUFTI, or MUPHTI, the chief of the ecclesiastical order, or primate, of the mussulman religion. Its authority is very great. In all actions, especially criminal ones, his opinion is required by giving him a writing in which the case is stated under feigned names, which he subscribes with words, *He shall*, or *shall not*, *be punished.* Such outward honour is paid to the mufti, that the grand seignior himself rises up to him, and advances seven steps to meet him, when he comes into his presence. The election of the mufti is solely in the grand seignior.

MUGGLETONIANS, a religious sect, which arose in England about the year 1657; so denominated from their leader Lodowick Muggleton, a journeyman taylor, who, with his associate Reeves, asserted, that they were the two last witnesses of God that should appear before the end of world.

MUGIL, *mullet*, a genus of fishes of the order abdominales Gen. char. lips membranaceous; the inferior carinated within: teeth none; at the corners of the mouth an inflected callus: gill-membrane, with six curved rays: body fleshy; scales large; dorsal fins two. Gmelin notices only five species. Shaw mentions nine. M. cephalus, or the common mullet is generally about 14 inches in length, and is found not only in the Northern and Mediterranean Seas, but in the Indian and Western Oceans. The mullets collect in multitudes almost close to the shores, thrusting their heads into the soft muddy bottoms in quest of aquatic insects. On the approach of summer, they ascend rivers, to a considerable distance from the sea, in order to deposit their ova. They are regarded by many as excellent food, but are not often seen at the tables of the opulent.

MULBERRY, See *Morus.*

MULE, in zoology, a mongrel kind of quadruped, usually generated between an ass and a mare, and sometimes between a horse and a she-ass. The mule is a sort of a monster, of a middle nature between its parents, and therefore incapable of propagating its species. Mules are chiefly used in countries where there are rocky and stony roads, as about the Alps, Pyrenees, &c. No creatures are so proper for carrying large burdens, and none so sure-footed. They will travel several months together with six or eight hundred weight upon their backs; they are much hardier and stronger than the horse, and will live and work twice his age.

MULES, among gardeners, denote a sort of vegetable monsters produced by putting the farina fecundans of one species of plant into the pistil or utricle of another. The signification of the word is likewise extended to every kind of animal produced by a mixture of two different species.

MULLER, or MULLAR, a stone flat and even at the bottom, but round at top, used for grinding of matters on a marble.

MULLERIA, a genus of the class and order diadelphia decandria. Pericarp elongated, fleshy, necklace-form, with one-seeded globules. There is one species, a tree of Surinam.

MULLET, or MOLLET, in heraldry, a bearing in form of a flat, or rather of the rowel of a spur, which it originally represented.

MULLUS, *surmullet*, a genus of fishes of the order thoracici. Gen. char. head compressed, scaly; mouth bearded; gill-membrane three-rayed; body covered with large subdeciduous scales.

Gmelin reckons six, Shaw thirteen species. 1. Mullus ruber, the red surmullet, is principally found in the Mediterranean and north seas, where it arrives at the length of twelve or fifteen inches: its colour is a rose-red, tinged with olive-colour on the back, and of a silvery cast towards the abdomen. It is generally considered as a very delicate fish, and is celebrated for having been the fashionable object of Roman luxury, and for which enormous sums are reported to have been sometimes given. The Romans practised a singular refinement in luxury, by first bringing the fish alive to the table in a transparent vessel, in order that the guests might contemplate the beautiful, and rapid changes of its evanescent colours during the time of its gradual expiration; after which it was prepared for their repast.

MULTANGULAR, a figure, or body, which has many angles.

MULTILATERAL, in geometry, is applied to figures which have more than four sides or angles.

MULTINOMIAL, or MULTINOMIAL-ROOTS, in mathematics, such roots as are composed of many names, parts, or members; as, $a + b + d + c$, &c. See *Root*.

MULTIPLE, in arithmetic, a number which comprehends some other several times, thus 6 is a multiple of 2.

MULTIPLE RATIO, or PROPORTION, is that which is between multiples. If the less term of the ratio is an aliquot part of the greater, the ratio of the greater to the less is called multiple, and that of the less to the greater, submultiple. A submultiple number is that contained in the multiple; thus, the numbers 1, 2, and 3, are submultiples of 9. Duple, triple, &c. ratios, as also sub-duples, sub-triples, &c. are so many species of multiple and submultiple ratios.

MULTIPLICAND. See *Arithmetic*.

MULTIPLICATION. See *Arithmetic* and *Algebra*.

MULTIPLYING-GLASS, in optics, one wherein objects appear increased in number. It is otherwise called a polyhedron, being ground into several planes, that make angles with each other; through which the rays of light issuing from the same point undergo different refractions, so as to enter the eye from every surface in a different direction.

MULTISILIQUÆ, in botany, the name of the twenty-sixth order in Linnæus's "Fragments of a Natural Method;" consisting of plants which have more seed-vessels than one.

MULTIVALVES, in natural history, the name of a general class of shells consisting of three or more shells.

MUM, a kind of malt liquor, much used in Germany, and chiefly brought from Brunswick, which is the place of most note for making it.

MUMMY, a body embalmed or dried in the manner used by the ancient Egyptians, or the composition with which it is embalmed. Mummy has been esteemed a solvent and balsamic; but whatever virtues have been attributed to it, seem rather such as depend more upon the ingredients used in preparing the flesh, than in the flesh itself.

MUNCHAUSIA, a genus of the class and order polyadelphia polyandria. Calyx is six-cleft; petals clawed; nectariferous bodies; pistils superior. There is one species, a tree of Java.

MUNICIPAL, in the Roman civil law, an epithet which signifies invested with the rights and privileges of Roman citizens.

Municipal, among us, is applied to the laws that obtain in any particular city or province; and those are called municipal officers who are elected to defend the interests of cities, to maintain their rights and privileges, and to preserve order among the citizens.

MUNTINGIA, a genus of the class and order polyandria monogynia. Calyx five-parted; cor. five-petalled; berry five-celled; seeds many. There is one species, a shrub of Jamaica.

MURÆNA, the *eel*, a genus of fishes of the order apodes. Gen. char. head smooth; nostrils tubular; gill-membrane ten-rayed; eyes covered by the common skin; body round, smooth; and mucous; spiracle behind the head or pectoral fins. There are five species according to Shaw. Gmelin enumerates nine. M. anguilla, or the common eel, is particularly distinguished by the sleekness and uniformity of its colours; an olive brown on the back, and a silvery lustre on the sides and beneath; but more expressively still by the great elongation of its under jaw. Its general size is from two to three feet; it is slow in its growth, and considered as very long lived. Its usual food consists of small worms, and the eggs of other fish. It is viviparous, producing great numbers at a birth; but of a very diminutive size. It continues generally during the day in a hole in the banks, which it furnishes with two avenues to facilitate its escape and security. By night it ranges for food. In winter it appears to be ingulphed in mud, and remains in this state of seclusion and tranquillity, if not torpor, till the return of spring invites it to a renewal of its excursions.

M. conger, or the conger eel, is generally darker above, and more splendid beneath than the former species. It grows to its largest size in the Mediterranean, where it is sometimes found ten feet long, and of the weight of a hundred pounds. It is found in the North and American seas also: it occasionally, particularly in the

excursions into rivers, and
abundance in the Severn.
tremely voracious, devour-
quantities of the smaller
rabs before the shell of the
etely formed and hardened.
r MURTHER. See *Homi-*

natural history, a genus of
imple shells, without any
of a single piece, and beset
or spines. The mouth is
ng, and has an expanded
avicle is rough.
of the murex is in some
d, in others depressed; and
ometimes dentated, and at
; the lip also in some is
thers elated, and in some
l the columella is in some
rs rugose.
zoology, a genus of insects
e order of vermes testacea.
of the snail kind: the shell
spiral valve, rough, with
s furrows; and the aper-
in an entire canal, either
ewhat ascending.
es of murex on the coasts
and Guatimala in Peru, a
cted, which dyes cottons,
of a beautiful permanent
ell which contains it ad-
ks that are washed by the
e size of a large walnut.
be extracted two ways:
imal after they have drawn
hell, then press it with a
d to tail, separate from the
here the liquor is collected
y the rest. When this ope-
eing repeated on several
rded a certain quantity of
d intended to be dyed is
nd the process is finished.
ich is at first of the white-
omes afterwards green, and
ll the thread is dry. Those
e of this method draw the
f the shell, and squeezing it
fluid which serves for dye-
t this operation four times
rvals, but always with less
y continue it, the fish dies.
esent known, says the Abbe
compared to this, either as
ness, or duration. It suc-
cotton, than wool, linen,

een sand of Peru. An ore

0 oxide of copper
1 muriatic acid
9 water.
-
0

in chemistry, a genus of
m the muriatic acid with
When heated they melt, and
without undergoing decom-
are soluble in water; ef-
sulphuric acid, and white
muriatic acid are disen-
nixed with nitric acid they
our of oxy-muriatic acid.

cid, may be procured in
if a retort with a curved
tube be half filled with well-dried common salt, and strong sulphuric acid be poured upon it, an effervescence takes place, and the elastic fluid extricated appears in the form of a white vapour as soon as it comes in contact with the atmosphere. When all the common air has been driven out of the retort, the subsequent portions of gas may be collected in glass jars, filled with mercury, and inverted in a bath of the same fluid. This is muriatic acid gas: it is transparent, colourless, and possessed of the same mechanical properties as common air. 100 cubic inches of it weigh nearly 60 grains. Its smell is pungent, and its taste highly acid. It is instantaneously fatal to animal life, and is incapable of supporting combustion; but if a burning taper be plunged into it, the flame, just before it goes out, assumes a green colour. If a little water be let into a jar filled with this gas, the gas disappears, and the liquid, consisting of a solution of the gas in water, is denominated simply muriatic acid. During the absorption of the gas, the water becomes hot. Ice also absorbs this gas, and is at the same time liquified. The quantity of this gas absorbed by water diminishes as the heat of the water increases, and at a boiling heat water will not absorb any of it: of course the gas is easily expelled from the liquid acid by heat, and may readily be procured by heating the common muriatic acid of commerce. The muriatic acid of the shops is always yellow, owing to a small quantity of iron which it holds in solution.

Muriatic acid is capable of combining with oxygen. When this acid is poured upon black oxide of manganese, a gas comes over, that is sometimes called "dephlogisticated muriatic acid," but more generally "oxy-muriatic acid." It is green, has a very bad odour, and is readily absorbed by water. 100 parts of oxy-muriatic acid contain 89 of muriatic acid, and 11 of oxygen.

Neither hydrogen nor carbon combines with muriatic acid, but charcoal absorbs it abundantly. Phosphorus absorbs a little, and sulphur imbibes it slowly. When mixed with nitric acid, it forms what was formerly called "aqua regia;" but now "nitro-muriatic acid." Muriatic acid in a state of gas neutralizes putrid miasmata, and destroys their bad effects. By this the most contagious diseases are prevented from spreading: two parts of sulphuric acid, and six of common salt, heated over a spirit lamp, or in a hot sand bath, will give out the gas very plentifully. The use of muriatic acid in the laboratory is very considerable; but in medicine and the arts it is employed only in the form of a muriate, or combined with some satifiable base.

MURRAIN, or *Gargle*, a contagious disease among cattle, principally caused by a hot dry season, or rather by a general putrefaction of the air, which begets an inflamation of the blood, and a swelling in the throat, that soon proves mortal.

The symptoms are, a hanging down and swelling of the head, abundance of gum in the eyes, rattling in the throat, a short breath, palpitation of the heart, staggering, a hot breath, and a shining tongue,

MURRAYA, a genus of the class and

ari, about two feet in diameter, and stuccoed within with particular neatness, on the border of some lake or stream. On the outside it is covered with a matting of rushes, compacted with great closenes to preclude moisture. These animals live on roots and herbage, which, however, they do not store up in their houses, but make excursions for as they are wanted during the winter; in summer they make long progresses in pairs. They have a strong odour of musk; and walk and run with great awkwardness; are easily tamed and highly valued for their fur.

M. decumanus, or the Norway rat, is supposed to have been imported into Europe from India, and in this country has almost extirpated the black rats. It subsists not only on grain and fruits, but frequently attacks poultry and rabbits, as well as various other animals. It is about nine inches long in the body, and nine more in the tail: will swim with considerable ease; is in the highest degre prolific, producing occasionally even eighteen young at a time, and breeding not unfrequently three times in a year. It is bold, fierce, and voracious. When closely followed, it turns on its enemy, and inflicts a severe wound on him. The depredations committed by these animals are calculated at an almost incredible amount. Their extreme fecundity, and their means of eluding the hostility of man render them one of the most serious nuisances. They plunder pigeon houses, granaries, warehouses, and every species of stores convertible to food, with incessant rapacity and perseverance. Their sagacity is very extraordinary; and snares laid for them, after one victim has been known to fall by them, are generally laid in vain. The surest method of destroying them is by mixing poison with some favourite food and laying it in their way.

M. rattus, or black rat, is considerably smaller than the former; its habits

herbage which afte
devoured to its extr
course exhibiting,
ness of vegetation,
fallow. These mig
gular periods, gene
of some years. It atta
spring at the legs
with great difficulty
their hold. Thousa
these progresses by
ten fatal conflicts occ

M. œconomus, or
sembles the leming
of irregular migrati
with particularly
with the greatest ski
derable magazines
are about five inche
whole length. In
swim over rapid rive
directly to the we
extreme fatigue an
mense numbers of
A single party has
to take two hours
astonished spectato
supposed the grand
gresses. The inhab
rob the hoards of
ter.

M. cricetus, or th
of the pouched rats
an species of that
ches are one on ea
and, when filled, ar
ders. These anima
and Russia, and ar
by the quantities of
vour, and carry o
store in their pouc
their habitations is
males arrange thei
from the males, an
them. As wint
seclude themselves
their stores, which

nt. They attack every weaker
nd very frequently destroy

ulus, or the common mouse,
nost every part of the world,
mid, but not ferocious. It pro
ally from six to ten at a birth
several times in a year. Its
k, and its eyes are bright and
limbs are neatly formed, and
nts are extremely agile. It is
seen of perfect whiteness.
he habitations of man, from
scarcely ever found at any
e distance, and in which it
trifling depredations.

icus, or the long-tailed field-
omewhat larger than the for-
a yellowish brown colour. It
corns, fruits, and grain, and
gazines in its burrow for the
is found principally in dry
common in all the temperate
Europe, and is particularly
and destructive in France,
stated to commit very great
der a scarcity of the usual sup-
animals are supposed to de-
ther.

rius, or the harvest mouse, is
of British quadrupeds, weigh-
e sixth part of an ounce. Its
st artificially platted of the
wheat, and is of the size of a
, the opening to it being closed
ily, as to be almost impercep-
is its compactness, that it may
ver the table without derange-
e found of this description con-
t young, and appeared com-
without the dam. In the win-
nimals burrow deep in the
their favourite habitation is
cks.

s, social mouse. The social
native of the Caspian deserts
e Volga and the Yaik, and
y of Hiscania. It lives in
situations, in large societies;
in many places being cover-
he little hillocks formed by
st out in forming the burrows,
bout a span deep, with eight
sages. The animals are al-
ved to live in pairs, or with a
ey are fond of tulip roots,
a principal article of their food.

s, blind rat. This is perhaps
argest and most remarkable of
easuring between seven and
s in length, and being entirely
th of eyes and tail.

botany, a genus of the poly-
oecia class and order. Na-
of scitamineæ. Calyx, spathe
ny-flowered; corolla two pe-
petal erect, five-toothed, the
ariferous, concave, shorter;
t; style one; all the flowers
dites; male, hermaphrodite
e filaments perfect; germ in-
rtive; female hermaphrodite,
t only perfect; berry oblong,
, inferior, many-seeded. There
pecies, M. paradisiaca, plan-
rises with a soft herbaceous
t 20 feet in height; the lower
stock is frequently as large as

a man's thigh, diminishing gradually to the top, where the leaves come out on every side, being often more than six feet long, and two broad. When the plant is grown to its full height, the spike of flowers appears from the centre of the leaves nearly four feet in length, nodding on one side. The fruit is about nine inches long, and more than an inch in diameter, a little incurved having three angles; the skin is tough, within is a soft pulp of a luscious sweet flavour; the spikes of fruit are often so large as to weigh upwards of forty pounds. It is a native of the East Indies, and other parts of the Asiatic continent; it is generally cultivated between the tropics, the fruit being excellent nutritious food.

M. sapientum, banana tree, differs from the preceding in having its stalks marked with dark purple stripes and spots; the fruit is shorter and rounder, with a softer pulp of a more luscious taste.

M. troglodytarum, has a scarlet spathe and scarlet berry, but is not eatable.

MUSCA, in natural history, the *fly*, a genus of insects of the order diptera: mouth with a soft exserted fleshy proboscis, and two equal lips; sucker furnished with bristles; feelers two, very short; antennæ generally short. This is a very numerous genus, not fewer than a thousand species have been enumerated. They are divided into sections; viz. A. with short feelers; and B. without feelers. These sections are again separated into others. The larva in the different tribes of flies differs far more in habit than the complete insects, some being terrestrial, and others aquatic. Those of the common kinds are distinguished by the title of maggots, and spring from eggs deposited on various putrid substances. Several of the aquatic kinds are of singularly curious formation, and exhibit wonderful examples of the provision ordained by nature for the preservation of even the meanest of animals. The general form of the pupa is that of an oval, differently modified, according to the species, and formed by the external skin of the larva. Some species cast their skin before they change into the pupa state. One of the most remarkable species is M. chamæleon, a large black fly, with a broad, flattish abdomen, having the sides of each segment yellow, forming so many abrupt semi-bands across that part. It proceeds from an aquatic larva, two inches and a half in length, which is common in stagnant waters in the summer months, and passes into its chrysalis state without casting its skin, which dries over it. M. tenax is a remarkable insect, about the size of a drone, of a brown colour, with transparent wings. It proceeds from a larva of a very singular appearance, being a long-tailed brown maggot, about three quarters of an inch in length, which is seen in muddy stagnant waters, drains, and other places of the dirtiest description. The feet are wonderfully calculated for enabling the animal to climb perpendicular places, in order to seek some proper situation to undergo its change into chrysalis, being very broad, and beset on their under surface with numerous small hooked claws. The larva commonly changes to a pupa about the end of August, the skin contracting and drying round the body. After remaining in this state about a fortnight, it gives birth to the complete insect. It is common in the month of September, and is often mistaken for a drone. Among the bristly flies is the M. carnaria, or common blow-fly, which deposits its eggs on animal flesh, either fresh or putrid. The larva, or maggots, hatch in the space of a few hours. When full grown, which happens in eight or ten days, they are of a yellowish colour, with a slight tinge of pale red. When the animal changes to a pupa, the skin dries round it, and the whole assumes a completely oval form, and a reddish colour. In ten days after the fly emerges.

M. vivipara greatly resembles the preceding, and is found in similar situations, but is viviparous, disclosing small ready-formed larvæ instead of eggs, which in this species are hatched internally.

MUSCI, in botany, *mosses*, one of the seven families, into which Linnæus divided all vegetables. The characteristics of mosses are, anthers without filaments; male flower constituted by the presence of the anthers, placed apart from the female, either on the same or distinct roots; female flower deprived of the pistillum; the seeds devoid of both lobes, and proper coverings. These plants constitute the second order of the class cryptogamia. This order is subdivided into eleven genera, from the presence or absence of the calyx, which in these plants is a veil that is placed over the tops of the stamina, and denominated calyptra, from the sexes of the plants, which bear male and female flowers, sometimes on the same, sometimes on distinct roots, and from the manner of growth of the female flowers, which are sometimes produced singly, sometimes in bunches or cones.

MUSCI, is also the name of the fifty-sixth order in Linnæus's Fragments of a Natural Method, consisting of genera, which are exactly those of the second order in the class cryptogamia. These plants resemble the pines and firs, and other evergreens in that class, in the form and disposition of their leaves; and manner and growth of the female flowers, which are generally formed into a cone. They frequently creep and extend themselves like a carpet upon the ground, trees and stones, collected into bunches or tufts. Few of the mosses are annual plants; being mostly perennial and evergreens. Their growth is slow; though preserved dry several years, they resume their original verdure upon being moistened. They delight in a cool moist situation, and northerly exposure, where they are screened from the sun. The roots are fibrous, slender, branched and short. The stems and branches are cylindric, and weak, creeping on the ground, and striking root on every side.

MUSCICAPA, the *fly-catcher*, a genus of birds of the order passeres. Bill flatted at the base, nearly triangular, notched each side, at the root beset with bristles; toes, in general, divided to their origin. There are 97 species.

M. grisola, or the spotted fly-catcher, arrives in this country in the spring, and leaves it in September. It attaches its nest not unfrequently to the end of a beam of a house; and sometimes builds it in a vine or sweet-briar tree, spread against a wall. It returns for a succession of seasons to the same situation. It feeds on insects, which it catches with astonishing dexterity, sometimes on the wing, sometimes by a sudden leap from its perch. It is one of the most silent and most familiar of summer birds. Its only note is a plaintive sound on the approach of danger. In Kent it is called the cherry-sucker, being particularly fond of that fruit.

M. atricapella, or the pied fly-catcher, is not to be found in great numbers in any part of this island, but is most frequently to be met with in Yorkshire, and the contiguous counties.

MUSCLE, in anatomy, a part of the human body, destined to move some other part, in general by a voluntary motion, being composed principally of flesh and tendinous fibres, with veins, nerves, and lymphatics; surrounded by, or included in, one common membrane. See *Anatomy*.

The muscular parts of animals are known in common language by the name of flesh. Muscular flesh is composed of a great number of fibres and threads, of a reddish or whitish colour; these, after they have been acted on by water, to separate the extraneous matter, are left in the state of grey fibres, insoluble in water, and becoming brittle when dry. The muscles likewise contain albumen, gelatine, extractive, phosphate of soda, of ammonia and lime.

MUSCLES, *Insertion and force of the*. The all-wise author of nature has furnished animals with limbs, moveable about the joints by means of muscular fibres inserted near the joint, or centre of motion.

In order to calculate the *force of any* muscle, we are to consider the bones as levers; and then the power or force of the muscle will be always to the resistance or weight it is capable of raising, as the greater distance of the weight from the centre of motion is to the lesser distance of the power.

The muscles that move the lower jaw, when taken altogether, do not in a man exceed the weight of a pound, and yet exert a force equal to [illegible] pounds, and in mastiff-dogs, wolves, bears, lions, &c., their force is vastly superior. The motions of the far greater part of the muscles are voluntary, or dependant on our will; those of a few others, involuntary. The former are called animal, the other natural motions. Finally, the motions of some of the muscles are of a mixed kind, partly animal and partly natural. Those muscles which perform the voluntary motions, receive nerves from the brain or spinal marrow; those which perform their motions involuntarily, have their nerves from the cerebellum; and those whose motion is partly voluntary, and partly involuntary, have theirs in part from the brain, and in part from the cerebellum.

MUSCOVY GLASS. See *Mica*.

MUSHROOM. See *Agaricus*.

MUSIC, a science, which teaches the

properties, dependences, and relations of melodious sounds; or the art of producing harmony and melody by the due combinations and arrangement of those sounds.

The antient writers on this science differ greatly as to its object and extent. In general, they give to it a much wider latitude than that which it obtains with us. Under the name of music they comprehended not only the melodious union of voices and instruments, but also the dance, gesture, poetry, and even all the other sciences. Hermes defines music to be the general knowledge of order; which was also the doctrine of Plato, who taught that every thing in the universe was music.

Music, however, properly so called, only concerns the due order and proportion of sounds; and is divided into two parts, the theoretical and the practical. Theoretical music comprehends the knowledge of harmony and modulation; and the laws of that successive arrangement of sound by which air, or melody, is produced. Practical music is the art of bringing this knowledge and those laws into operation, by actually disposing of the sounds, both in combination and succession, so as to produce the desired effect; and this is the art of composition: but practical music may, in fact, be said to extend still further, and to include not only the production of melodious and harmonious composition, but also its performance.

MUSES, certain fabulous divinities amongst the Pagans, supposed to preside over the arts and sciences. Some reckon the muses to be no more than three, *viz.* Mneme, Aœde, and Melete; that is, memory, singing, and meditation: but the most ancient authors, and particularly Homer and Hesiod, reckon nine; *viz.* Clio, which means glory; Euterpe, pleasing [illegible]; Terpsichore, *rejoicing the* heart: Erato, the amiable; Polyhymnia, a multitude of songs; Urania, the heavenly; and Calliope, sweetness of voice. To Clio, they attributed the invention of history; to Melpomene, tragedy; to Thalia, comedy; to Euterpe, the use of the flute; to Terpsichore, the harp; and to Erato, the lyre and lute; to Calliope, heroic verse; to Urania, astrology; and to Polyhymnia, rhetoric.

MUSEUM, a collection of rare and interesting objects, selected from the whole circle of natural history and the arts, and deposited in apartments or buildings, for the inspection of the learned and the great mass of the public.

MUSK, a substance secreted into a bag, situated in the umbilical region of the moschus moschifer. Its colour is brownish red; its feel unctuous; its taste bitter; and its smell aromatic and intensely strong. It is partially soluble in water, which acquires its smell; and in alcohol, but that liquid does not retain the odour of musk.

MUSKET, a fire-arm borne on the shoulder, and used in war. The length of a musket is fixed at three feet eight inches from the muzzle to the pan, and it carries a ball of twenty-nine to two pounds. In fortification, the length of the line of defence is limited by the ordinary distance of a musket-shot, which is about one hundred and twenty fathoms.

MUSKETOON, a short thick musket, whose bore is the thirty-eighth part of its length: it carries five ounces of iron, or seven and a half of lead, with an equal quantity of powder.

MUSLIN, a fine thin sort of cotton cloth, which bears a downy nap on its surface.

MUSSÆNDA, a genus of the pentandria monogynia class and order. The cor. is funnel-form; stigma two, thickish; berry oblong, inferior; seeds disposed in four rows. There are three species, shrubs of China.

MUSSEL. See *Mytilus.*

MUSTELA, a genus of quadrupeds of the order feræ: the generic character is, fore teeth upper, six, erect; acute, distant: lower six, obtuse, crowded, placed within; tongue smooth. There are twenty-eight species.

M. lutra, the common otter, is found in almost every part of Europe, as well as in the colder regions of Asia; inhabiting the banks of rivers, and feeding principally on fish. The length of the otter is nearly two feet from nose to tail, and of the tail about sixteen inches. Its colour is a deep brown, with a small light-coloured patch on each side the nose, and another under the chin. The otter shews great sagacity in forming its habitation: it burrows under ground on the banks of some river or lake, and always makes the entrance of its hole under water, working upwards to the surface of the earth; and, before it reaches the top, makes several holts or lodges, that in case of high floods it may have a retreat, and then makes a minute orifice for the admission of air. The otter is naturally a very fierce animal; and will inflict very severe produces four or five young at a birth; this commonly happens early in the spring. Young otters, if taken at a very early age, may be tamed, and taught to hunt for fish, and bring them to their master.

2. M. lutreola, the smaller otter, very much resembles the common otter, but is smaller; the body is of a dusky colour, but with a considerable cast of tawny. In size it falls short of the common otter, measuring about a foot in length. Its fur is very valuable, and next in beauty to that of the sable.

3. M. lutris, the sea otter, is the largest of the otters, measuring about thre feet from the nose to the tail, and the tai thirteen inches. The colour of this specie is a deep glossy, brownish black, the fu being extremely soft and very fine. Grea numbers are found in Bering's island Kamschatka, the Aleutian, Fox, and Kuril islands.

4. M. fero, ferret, has eyes red an fiery. It inhabits Africa. In Europe it i tamed to catch rabbits, rats, &c. It pr creates twice a year, and brings forth fro six to eight at a time.

M. erminea, stoat. Is about te inches long; hair short, which in norther climates becomes white, except the out half of the tail, which remains blac The fur is very valuable.

MUSTER, in a military sense, a review of troops under arms, to see if they be complete, and in good order; to take an account of their numbers, the condition they are in, viewing their arms, and accoutrements, &c.

MUSTER *roll*, a specific list of the officers and men in every regiment, troop, or company, which is delivered to the inspecting field-officer, muster-master, regimental or district paymaster (as the case may be) whereby they are paid, and their condition is known.

MUTE, a person refusing to plead to an indictment for felony, &c. is considered as pleading guilty, and punished as upon confession.

A prisoner deaf and dumb from his birth, may be arraigned for a capital offence, if intelligence can be conveyed to him by signs or symbols.

MUTE, in grammar, a letter which yields no sound without the addition of a vowel.

MUTILLA, a genus of insects, of the order hymenoptera; antennæ filiform; feelers four, articulations obconic, seated on the tip of the lip; jaw membranaceous at the tip, lip projecting obconic; wings in most species obconic; body pubescent, thorax retuse behind; sting pungent, concealed.

MUTINY, in a military sense, to mutiny is to rise against authority. Any officer or soldier who shall use traitorous or disrespectful words against the king, or any of the Royal Family; or who shall behave himself with contempt or disrespect towards the general, or other commander in chief of the forces, or shall speak words tending to their hurt or dishonour; or who shall begin, excite, cause, or join in any sedition; or who, being present at any mutiny or sedition, does not use his utmost endeavours to suppress any mutiny, or intended mutiny, does not give information to his commanding officer; or who shall strike his superior officer, or draw, or offer to draw, or lift up any weapon or offer any violence against him, being in the execution of his office, or who shall disobey any lawful command of his superior officer; is guilty of mutiny.

MUTISIA, in botany, a genus of the syngenesia polygamia superflua class and order. Calyx cylindric, imbricate; cor. of the ray oval oblong; of the disk trifid; down feathered; receptacle naked. There is but one species, *viz.* M. clematis, found in New Granada.

MUTULE, in architecture, a kind of square modillion, set under the corniche of the doric order.

MUTUS & SURDUS. See *Mute.*

MYA, a genus of insects of the vermes testacea class and order. Animal ascidia; shell bivalve, generally gaping at one end; hinge with broad thick strong teeth, seldom more than one, and not inserted into the opposite valve. There are about twenty-five species. M. declivis has a brittle, semi-transparent shell, sloping downwards near the open end; the hinge slightly prominent. It is found about the Hebrides, where the fish is in great esteem. M. margaritifera, is found in mountainous rivers, and about cataracts. It is about five inches long, and half as many broad; and it is noted for producing mother of pearl and pearls; the latter is said to be a disease of the fish analogous to the stone in the human body.

MYAGRUM, *gold of pleasure*, a genus of the tetradynamia siliculosa class and order. Silicle terminated by a conical style, with a cell commonly one-seeded. There are ten species. The sativum is cultivated in Germany for the sake of the expressed oil of the seeds.

MYCTERIA, the *jabiru*, a genus of birds of the order grallæ. Bill long and large, both mandibles bending upwards, the upper triangular; nostrils small and linear, and no tongue; feet 4-toed and cleft. M. Americana, or the American jabiru, is nearly six feet in length. It abounds in the levels of Cayenne, and other parts of South America, feeds upon fish, of which it devours immense quantities, and builds in vast trees, laying only two eggs. It is extremely wild, and when young is used for food. M. Asiatica is likewise a very large bird, inhabits the East Indies, and feeds on snails.

MYGINDA, a genus of the tetrandria tetragynia class and order: calyx four-parted; petals four; drupe globular. There are three species, natives of the West Indies.

MYOPES. Those who by a natural defect have the cornea and chrystalline humour too convex, are called myopes. This figure, increasing the quantity of refraction, tends to render the rays of such pencils as are formed in the eye more convergent, so that the point where these same rays meet is on this side of the retina. Myopes see distinctly those objects only which are near, which send towards the eye rays more divergent, and therefore less disposed to converge, through the other humours. This imperfection is remedied by the use of a glass slightly concave.

MYOPORUM, a genus of the didynamia angiospermia class and order: cal. five-parted; cor. bell-shaped, with a spreading almost equal five-parted border; berry one or two-seeded; seeds two-celled. There are four species, natives of the South Sea islands.

MYOSOTIS, *scorpion grass*, a genus of the pentandria monogynia class and order; cor. salver-shaped, five-cleft, emarginate; opening closed with arches. There are seven species.

MYOSURUS, *mouse-tail*, a genus of the pentandria polygynia class and order. Cal. five-leaved, growing together at the base; petals five, having a melliferous pore at the claw; seeds numerous. There is but 1 species, viz. M. minimus, mouse-tail: this plant is very nearly allied to ranunculus. Flowers are extremely small, and are succeeded by long, slender spikes of seeds, resembling the tail of a mouse.

MYOXUS, the *dormouse*, in natural history, a genus of mammalia of the order of glires. Two fore-teeth, the upper wedge-formed, the lower compressed; four grinders in each jaw; long whiskers; tail cylindric, bristly, and thicker towards the end; legs of equal length; fore feet with *four* toes. These animals feed only on vegetables, and burrow in the ground, in which they continue during the winter in a torpid state. They are nocturnal, sleeping in their habitations the greater part of the day; they carry food to their mouths with their fore-paws, sitting erect; and advance by leaps of several feet at a time, instead of walking. There are four species:

M. glis, or the fat dormouse, is found in Germany and Russia, and has much of the manners of a squirrel, haunting trees and feeding on fruits and nuts which it stores for its winter consumption. It was highly valued by the Romans as an article of food. It is six inches long to the tail, which is about four. It is not easily tamed.

M. muscardinus, or the common dormouse, is nearly of the size of a mouse, and inhabits thick hedges, making its nest in the hollow of some tree. It forms a hoard for the winter, during which it is for the greater part abstinent and torpid. It occasionally is roused by the intervention of temperate days, recurs to its stock, and then returns to its slumbers, till spring recovers it to daily exertion.

MYRICA, a genus of the dioecia tetrandria class and order of plants. Nat. ord. amentaceæ. Ament with a crescent-shaped scale; corolla none; female, styles two; berry one-seeded. There are nine species, of which M. gale, sweet-gale, sweet-willow or candleberry myrtle, rises with many shrubby stalks from two to four feet in height, dividing into several slender branches; the buds are composed of nine leafy, shining scales; leaves alternate, an inch and a half in length; they have a bitter taste, and an agreeable odour, like those of myrtle. The northern nations formerly used this plant instead of hops, and it is still in use for that purpose in some of the western isles; unless it is boiled a long time it occasions the head-ache. The catkins or cones, boiled in water, throw up a scum resembling bees' wax, and which, gathered in sufficient quantities, would make candles. From M. cerifera, American candleberry myrtle, candles are prepared in America; it is also used in tanning calf skins; gathered in autumn, it will dye wool yellow. The Welsh lay branches of it upon and under their beds, to keep off fleas and moths. In the Highlands of Scotland, an infusion of the leaves is frequently given to children to destroy worms. Native of the northern parts of Europe and North America.

MYRYOPHYLLUM, a genus of the monoecia polyandria class and order. Nat. order inundatæ. Cal. four-leaved; cor. none; male, stamina eight: female, pistils *four*; style none; seeds four, naked. There are two species.

MYRISTICA, *nutmeg-tree*, a genus of the dioecia syngenesia class and order. Nat. ord. of lauri. Calyx trifid; corolla none; male, filament columnar; anthers terminating, united: female, capsule superior, drupaceous, two valved; nut involved in an aril, called the mace. There are three species, of which M. aromatica, aromatic or true nutmeg-tree, grows to a considerable size in the East Indies. The leaves are aromatic; and if the trunk or branches be wounded, they will yield a glutinous red liquor. See *Nutmeg*.

MYRMECIA, in botany, a genus of the tetrandria monogynia class and order. Cal. tubular; five-toothed; cor. one-petalled; germ with five glands at the base; stigma bilamellate; capsule two celled, two-valved, many-seeded. There is but one species, a shrub of Guiana, called tachi, or ants' nest by the natives, its hollow trunk being the retreat of these insects.

MYRMECOPHAGA, the *ant-eater*, a genus of mammalia, of the order bruta. Gen. char. no teeth; tongue extensile and cylindric; mouth elongated into a form somewhat tubular; body covered with hair. They subsist on insects; thrusting their tongue into a nest of ants, the glutinous substance which exudes from it serves to attach to it inextricably numbers of them, and when the animal perceives that he has secured a sufficient number he retracts his tongue, and swallows his victims. There are seven species. The following are principally deserving of attention.

M. jubata, or the great ant-eater, is an animal of a very rough appearance, and more than seven feet in length. It is a native of South America, slow in its movements, and heavy in its manners, sleeping during almost the whole day; the night it passes principally in search of food. With its foreclaws it can destroy by pressure and laceration animals apparently much stronger than itself.

M. tetradactyla, or the middle ant-eater, is far inferior in size, being little more than two feet in its whole length. It is a native of the same regions, and is similar in its habits. It possesses, however, a prehensile power with its tail, and in climbing trees, and moving from branch to branch, is much assisted by this circumstance.

M. didactyla, or the little ant-eater, is about as large as a squirrel, covered with a soft and curled fur of yellow brown, and possesses considerable elegance; its tail is prehensile; it resides in trees, and subsists, like the former species, principally on insects, and particularly ants. It is a native of Guiana.

M. aculeata, or the aculeated ant-eater, is a native of New Holland. It is generally found in the middle of an ant's nest, and will burrow with extreme celerity. It will even tear up a pavement of some firmness. It is little more than a foot long.

MYRMELEON, *lion ant*, a genus of insects of the order neuroptera. Mouth with a horny, acute mandible and jaw; feelers six; antennæ thicker at the tip; wings deflected; tail of the male armed with a forceps, composed of two straight filaments. There are 16 species. The myrmeleon in the larva state preys on ants and lesser insects, and for the purpose of ensnaring them, sinks itself into the sand, and forms a kind of funnel or pit in which it lies buried, the head only appearing above the sand. Into this hollow such insects as wander near it are sure to fall, and not being able to crawl up the sides of loose sand, are seized and devoured by the lion-ant. The larva is six-footed, with exserted, toothed jaws; pupa enclosed in a ball composed of sand or earth, agglutinated by very fine silk, which it draws from a tubular process at the extremity of the body. It continues in the state of chrysalis about four weeks, and then gives birth to the complete insects.

MYROBALANS, a kind of medicinal fruit brought from the Indies.

MYRODENDRUM, a genus of the class and order polyandria monogynia. Cor. five-petalled; stigma, capitate, five-lobed; per. five celled. There is one species, a tree of Guiana.

MYRODIA, a genus of the monadelphia polyandria class and order; calyx single, one-leafed; cor. five-petalled; pist. one column of anthers undivided, drupe dry, two nuts.

MYROSMA, a genus of the monandria monogynia class and order; the cal. is double, outer three-leaved, inner three-parted; cor. five-parted: caps. three-cornered. There is one species.

MYROXYLUM, a genus of the monogynia order, in the decandria class of plants. The calyx is campanulated; the superior petal larger than the rest; the germ is longer than the corolla; the legumen monospermous. There is but one species, the peruiferum, a native of Peru and the warmer parts of Africa. It is this shrub that yields the balsam of Peru, which is said to be extracted from it by coction in water. This balsam, as brought to us, is nearly of the consistence of thin honey, of a reddish brown colour inclining to black, and an agreeable aromatic flavour.

MYRRH, a gum resin brought from the Levant and East Indies, and used in medicine. It is hard, dry, glossy, of a reddish brown colour, with an admixture of yellow; transparent, or opake; of a peculiar strong smell, and a bitter, somewhat biting taste. With water it forms a yellow opaque soluber, and by distillation yields an essentialsoil.

MYRSINE, in botany, a genus of the pentandria monogynia class and order. Nat. ord. bicornes. Cor. half five-cleft, converging: germ filling the corolla: berry one-seeded, with a five-celled nucleus. There are two species.

MYRTUS, *myrtle*, a genus of the icosandria monogynia class and order. Nat. ord. hesperideæ. Cal. five-cleft, superior; petals five; berry two or three-celled; seeds several, gibbous. There are thirty-six species and many varieties. This genus is composed of small trees and shrubs; flowers in some solitary, with two scales at the base; in others forming opposite corymbs or panicles, axillary or terminating. The M. communis, common myrtle, is a native of Asia, Africa, and the south of Europe. The pimento, or allspice tree, is about thirty feet in height, and two in circumference. It is a native of New Spain, and the West Indies. The flavour and fruit have an highly aromatic fragrance.

MYTHOLOGY, the history of the fabulous gods and heroes of antiquity, with the explanations of the mysteries or allegories couched therein.

MYTILLUS, the *muscle*, a genus of insects of the vermes testacea class and order. Animal allied to an ascida; shell bivalve, rough, generally affixed by a byssus, or beard of silken filaments; hinge mostly without teeth, with generally a subulate, excavated, longitudinal line. There are between fifty and sixty species. M. margaritiferus, which inhabits the American and Indian Seas, is about eight inches long, and something broader; the inside is beautifully polished, and produces true mother-of-pearl, and frequently the most valuable pearls. M. edulis inhabits European and Indian Seas, found in large beds, adhering to other bodies by means of a long silky beard: the fish affords a rich food, but is often noxious to the constitution.

MYXINE, the hag; a genus of insects belonging to the order of vermes intestina. It has a slender body, carinated beneath, mouth at the extremity, cirrated; the two jaws pinnated; an adipose or rayless fin round the tail and under the belly. M. glutinosa, about eight inches long. It inhabits the ocean; enters the mouths of fish when on the hooks of lines that remain a tide under water; and totally devours the whole, except the skin and bones.

N

N, Or *n*, the thirteenth letter, and tenth consonant of our alphabet: it is a liquid, the sound of which is formed by forcing the voice strongly through the mouth and nostrils; being at the same time intercepted by applying the tip of the tongue to the fore-part of the palate, with the lips open. It suffers no consonant immediately after it, in the beginning of words and syllables; nor any before it, except *g*, *k*, and *s*; as in *gnaw*, *know*, *snow*, &c. as a numeral N stands for 900; and with a dash over it, thus $\overline{\text{N}}$ for 900,000; N, or N°, stands for numero, i. e. in number; and N. B. for nota bene, note well, or observe well.

NABONASSAR, or *Æra of Nabonassar*, a method of computing time from the commencement of Nabonassar's reign.

NADIR, in astronomy, that point of the heavens which is diametrically opposite to the zenith.

NAIAS, in botany, a genus of the diœcia monandria class and order. Nat. ord. inundatæ. Male, calyx cylindric, bifid; cor. four-cleft; filament none: female, cal. none; cor. none; pistil one; capsule ovate; one celled. There is but one spe-

iz. N. marina, native of the sea
of the south of Europe.

IL, the nails have been chemically
ined, and are found to be compos-
iefly of a membranous substance,
possesses the properties of co-
ed albumen. They contain also a
phosphate of lime. See *Anatomy*,
orn.

ILS, in building, &c. small spikes
n, brass, &c. which being driven
ood, serve to bind several pieces
er, or to fasten something upon
The several sorts of nails are very
rous: as 1. Back and bottom nails;
at shanks to hold fast, and not open
ood. 2. Clamp-nails, for fastening
lamps in buildings, &c. 3. Clasp-
whose heads clasping and sticking
he wood, render the work smooth,
o admit a plane over it. 4. Clench-
used by boat and barge-builders. 5.
nails, used for nailing on clouts to
rees. 6. Deck-nails. 7. Dog nails,
tening hinges on doors, &c. 8. Flat
, much used in shipping, and are
r where there is occasion to draw
old fast, and no conveniency of
ing. 9. Jobent-nails, for nailing
lates of iron to wood, &c. 10. Lead-
for nailing lead, leather, and can-
to hard wood. 11. Port-nails, for
g hinges to the ports of ships. 12.
f-nails, which are four-square, used
ting. 13. Ribbing-nails, principally
in ship building, for fastening the
ships in their places. 14. Rose-
which are drawn four-square in the
, and commonly in a round tool.
ther nails, which have a full head,
re chiefly used in fastening rother-
to ships. 16. Round head nails, for
ng on hinges, or for any other use
a neat head is required. 17. Scup-
ails, which have a broad head, and
sed for fastening leather and canvass
od. 18. Sharp-nails, with sharp
s and flat shanks, for nailing soft
. 19. Sheathing-nails. 20. Square-
used for hard wood, and nailing up
fruit. 21. Tacks, &c. Nails are
o be toughened when too brittle, by
g them in a fire-shovel, and putting
tallow or grease among them.

IL is also a measure of length, being
xteenth part of a yard.

IS, a genus of the vermes mollusca
and order. Body creeping, long,
r, pellucid, depressed; peduncles,
t, with small bristles on each side.
e are ten species.

ISSANT, in heraldry, is applied to
animal issuing out of the midst of
ordinary, and showing only his
, shoulders, fore-feet, and legs, with
p of his tail, the rest of his body being
n the shield, or some charge upon it.

KED, in architecture, is the surface
lain from whence the projectures
, or which serves as a ground to the
ctures.

MA, a genus of the pentandria di-
class and order. Nat. ord. succu-
. Calyx five-leaved, corolla five-
d; capsule one-celled, two-valved.
e is one species.

NDINA, a genus of the hexandria
gynia class and order. Calyx many-leaved, imbricate; cor. six-petalled. There is one species, viz. N. domestica, a native of Japan.

NAPÆA, a genus of the dioecia monadelphia class and order. Nat. ord. columniferæ. Calyx single and cylindric, arils coalited and monospermous. There are two species, natives of Virginia and many other parts of North America; from their bark a kind of hemp may be procured.

NAPTHA, a name given to the most liquid bitumen. It is of a light colour, more or less transparent, perfectly thin and liquid, and so light as to float on water; it is odoriferous, volatile, and inflammable. See *Bitumen*, *Petroleum*, &c.

NARCISSUS, a genus of the hexandria monogynia class and order. Nat. ord. spathaceæ. Petals six-equal; nectary funnel-form, one-leafed; stamina within the nectary. There are fifteen species, and a great number of varieties; particularly of the tazetta, and the jonquil.

NARCOTIC *principle*. See *Opium*.

NARCOTICS, in medicine, soporiferous medicines, which excite a stupefaction.

NARDUS, in botany, *mat-grass*, a genus of the triandria monogynia class and order. Natural order of gramina, gramineæ, or grasses. Essential character: calyx none; corolla two-valved. There are four species. This plant was highly valued by the ancients as a medicine and perfume.

NARRATION, in oratory and history, a recital or rehearsal of a fact as it happened, or when it is supposed to have happened.

NATIONAL DEBT, the sum owing by government, to individuals, who have advanced money for public purposes. See *Funds*, and *Sinking Fund*.

NATIVITY, in old law books, signifies villanage and servitude.

NATROLITE, in mineralogy, a species of the zeolite family. It occurs massive, and in its fracture presents straight or diverging fibres; its colour is light yellow, with little lustre.

NATRON, a term given to soda, upon the supposition that it is the natron or nitrum of the ancients. See *Soda*. Natural natron occurs either as an efflorescence on the surface of the soil, or on decomposing rocks of particular kinds, or on the sides and bottoms of lakes that become dry during the summer.

NATURAL HISTORY, may be divided into two heads; the first teaches us the characteristics, or distinctive marks of each individual object, whether animal, vegetable, or mineral; the second makes us acquainted with all its peculiarities, as to its habits, its qualities, and its uses. To assist in attaining the first, it is necessary to adopt some system of classification, in which individuals that agree in particular points may be arranged together. The Linnæan system is the most simple and perfect.

A knowledge of the second head is only gained by an investigation of each particular object; for this we refer the reader to the several genera described in the course of this work.

The study of natural history consists in the collection, arrangement, and exhibition of the various productions of the earth. These are divided into the three grand kingdoms of nature, the boundaries of which meet together in the zoophites. See *Zoophites*.

Minerals inhabit the interior parts of the earth. They are bodies concrete without life and sensation. See *Mineralogy*.

Vegetables clothe the surface with verdure, imbibe nourishment through bibulous roots, breathe by leaves, and continue their kind by the dispersion of seed within prescribed limits. They are organized bodies, and have life and not sensation. See *Botany*.

Animals inhabit the exterior parts of the earth, respire and generate eggs; are impelled to action by hunger, affections, and pain; and by preying on other anima's and vegetables, restrain within proper bounds and proportions the numbers of both. They have organized bodies, and have life, sensation, and the power of locomotion.

Man, governor and subjugator of all other beings, is alone able to form just conclusions from such things as present themselves to his senses, which consist of natural bodies. Hence the first step of wisdom is to know these bodies; and to be able, by marks imprinted on them by the God of nature, to distinguish them from each other, and to affix to every object its proper name.

The Linnæan system is divided into five branches, each subordinate to the other: these are, class, order, genus, species, and variety, with their names and characters. In this arrangement, the classes and orders are arbitrary, the genera and species are natural.

Of the three grand divisions above referred to, the animal kingdom ranks highest in comparative estimation, the next the vegetable, and last is the mineral kingdom.

Animals enjoy sensation by means of a living organization, animated by a medullary substance; perception by nerves; and motion by the exertion of the will. They have members for the different purposes of life; organs for their different senses; and faculties or powers for the application of their different perceptions. They all originate from an egg. Their external and internal structure, habits, instincts, and various relations to each other, will be found under the different genera. See *Physiology*, &c.

The division of animals is into six classes, formed from their internal structure.

1. Mammalia 2 Birds	Heart with 2 auricles & 2 ventricles; blood warm and red.	viviparous oviparous
3. Amphibia 4. Fishes	Heart with 1 auricle & 1 ventricle: blood cold and red.	lungs voluntary
5. Insects 6. Vermes	Heart with 1 auricle, ventricle; sanies cold and white.	have antennæ tentacula

The following is an abstract of Linnæus's Systema Naturæ, by Gmelin.

Class I.—Mammalia.

Order.	Genera.	Species.
Primates	4	58
Bruta	7	23
Feræ	10	136
Glires	10	129
Pecora	8	90
Belluæ	4	25
Cete	4	14
7	47	577

Class II.—Aves.

Order.	Genera.	Species.
Accipitres	4	471
Picæ	26	667
Anseres	13	274
Grallæ	20	325
Gallinæ	10	129
Passeres	17	1038
6	87	[illegible]

Class III.—Amphibia.

Order.	Genera.	Species.
Reptilia	4	147
Serpentes	6	219
2	10	366

CLASS IV.—Pisces.

Order.	Genera.	Species.
Apodes	10	37
Jugulares	6	92
Thoracici	19	411
Abdominales	16	293
Branchiostegi	10	93
Chondropterygii	5	99
6	66	949

Class V.—Insectæ.

Order.	Genera.	Species.
Coleoptera	55	[illegible]
Hemiptera	14	124
Lepidoptera	3	2000
Neuroptera	7	178
Hymenoptera	25	1139
Diptera	12	1897
Aptera	15	679
7	121	[illegible]

Class VI.—Vermes.

Order.	Genera.	Species.
Intestina	21	294
Mollusca	31	439
Testacea	36	2535
Zoophita	15	489
Infusoria	15	170
5	118	4015

NATURAL *philosophy*, otherwise called *physics*, is that science which considers the powers of nature, the properties of natural bodies, and their actions upon one another. Laws of nature are certain

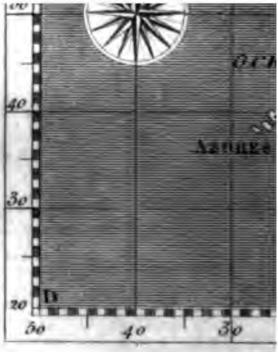


Fig. 2.

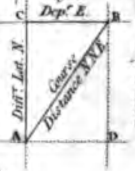


Fig. 3.

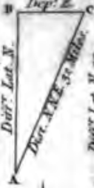


Fig. 8.

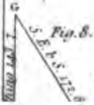


Fig. 10.

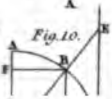
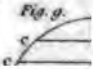


Fig. 9.



or general rules, of motion and bserved by natural bodies in their s upon one another. Of these laws Newton has established three :—1. every body persevers in the same either of rest or uniform rectilinear n, unless it is compelled to change ate by the action of some foreign or agent. 2. The motion, or change tion, is always proportionable to the g force by which it is produced, the direction of the right line in that force is impressed. 3. Re-ac- s always contrary and equal to ac- or the actions of two bodies upon nother are always mutually equal, irected contrary ways, and are to imated always in the same righ See *Experimental Philosophy*.

TURALIZATION, is when an alien is put in the same state as if he had born in the king's liegeance, excep e is incapable of being a member o ivy council or parliament, and o e any office or grant. See *Alien*.

VAL *stores* comprehend all those nibers made use of, not only in the navy, but in every other kind o ation; as timber for shipping, pitch emp, cordage, sail-cloth, gunpow ordnance, and fire-arms of every ship-chandlery wares, &c.

UCLÆA, a genus of the pentandria gynia class and order. The corolla nel-form; seed one, inferior, two- l; receptacle, common, globular. are four species, trees of the East s, &c.

VIGATION, the art of conducting from one port to another

names of the two great divisions of ation are taken merely from the kind rts made use of. Plane sailing is which the plane chart is made use nd Mercator's sailing, or globular g, is that in which Mercator's chart

Plane sailing. As a necessary preli- ry to our understanding this method igation, we shall here give the con- tion of the plane chart.

This chart supposes the earth to be a , and the meridians parallel to one er; and likewise the parallels of lati- at equal distances from one another y really are upon the globe. Though ethod is in itself evidently false; yet short run, and especially near the tor, an account of the ship's way may pt by it tolerably well.

ving determined the limits of the , that is, how many degrees of lati- and longitude or meridional distance contain: suppose from the lat. of g. N. to the lat. of 71 deg. N. and from ngitude of London in 0 deg. to the of 50 deg. W.; then choose a scale al parts, by which the chart may ntained within the size of a sheet of on which it is intended to be drawn. a parallelogram ABCD. (Plate Na- on, fig. 1). the length of which AB north to south shall contain 51 de- , the difference of latitude between nits of 20 deg. and 71 deg.; and the th AD from east to west shall con- e proposed 50 degrees of longitude.

About the boundaries of the chart make scales containing the de es, halves, and quarters of degrees; dr ing lines across the chart through every or 10 degrees. On a straight slip of p eboard, or stiff paper let the scale of he degrees and parts of degrees of longitude, in the line AD be laid close to the edge; and the divisions numbered from the right hand towards the left, being all west longitude.

Seek in a geographical table for the latitudes and longitudes of the places contained within the proposed limits; and to lay down any place, lay the edge of the
the divisions on each
the latitude, of the
ing of its division
r AB; and
e longitude
nt, and this
e proposed;
e other pla-

one point to
the a contiguous
re of the lands
pose will be de-

mes to the respective
ne convenient place insert
the chart will be com-

The angle formed by the meridian and rhumb that a ship sails upon, is called, the ship's course. Thus, if a ship sail on the N.N.E. rhumb, then her course will be 22 deg. 30 min.; and so of others.

3. The distance between two places lying on the same parallel counted in miles of the equator; or the distance of one place from the meridian of another counted as above on the parallel passing over that place, is called meridional distance; which in plane sailing, goes under the name of departure.

4. Let A (fig. 2), denote a certain point [illegible] meridian, and AD the parallel of latitude passing through it; and suppose a ship to sail from A on the N. N.E. rhumb till she arrives at B; and through B draw the meridian BD, (which, according to the principles of plane sailing, must be parallel to CA,) and the parallel of latitude BC; then the length of AB, *viz*. how far the ship has sailed upon the N. N.E. rhumb is called her distance; AC or BD will be her difference of latitude, or northing; CB will be her departure, or easting; and the angle CAB will be the course.

5. Since the distance, difference of latitude, and departure, form a right-angled triangle, in which the oblique angle opposite to the departure is the course and the other its complement; therefore having any two of these given, we can (by plane trigonometry) find the rest; and hence arise the cases of plane sailing which are as follow:

Case 1. Course and distance given, to find the difference of latitude and departure.

Example. Suppose a ship sails from the latitude 50 deg. 25 min. north, N. NE. 32 miles (fig. 3). Required the difference of latitude and departure, and the latitude come to. Then (by right angled trigonometry) we have the following analogy for finding the departure, viz.

As radius - - - - - - -		10.00000
to the distance AC -	32. -	1.50515
so is the sine of the course A 22 deg. 30 min. - - - - -		9.58284
to the departure BC -	12.25	1.08799

so the ship has made 12.25 miles of departure easterly, or has got so far to the eastward of her meridian. Then for the difference of latitude or northing the ship has made, we have (by rectangular trigonometry) the following analogy, viz.

As radius - - - - -		10.000000
to the distance AC - - -	32	1.50515
so is the sine of the course A 22 deg. 30 min. - - - - - -		9.58284
to the difference of lat. AB	29.57	1.47077

so the ship has differed her latitude, or made of northing, 29.57 minutes.

And since her former latitude was north, and her difference of latitude also north; therefore,

	deg.	min.
To the latitude sailed from - -	30	25 N
add the difference of latitude	00	29.57
and the sum is the latitude come to	30,	54.57 N.

By this case are calculated the tables of difference of latitude, and departure, to every degree, point, and quarter-point of the compass.

Case II.—Course and difference of latitude given to find distance and departure.

Example.—Suppose a ship in the latitude of 45 deg. 25 min. north, sails NE*b*N¼ easterly (Plate Navigation, fig. 4.) till she comes to the latitude of 46 deg. 55 min. north: required the distance and departure made good upon that course.

Since both latitudes are northerly, and the course also northerly: therefore,

	deg.	
From the latitude come to	46	55
substract the latitude sailed from	45	25
and there remains	01	30

the difference of latitude equal to 90 miles

And (by rectangular trigonometry) we have the following analogy for finding the departure BD, viz.

	deg. min.	
As radius		10.00000
is to the diff. of lat. AB	90	1.95424
so is the tangent of course A	39, 22	9.91404
to the departure BD	73.84	1.86828

so the ship has got 73.84 miles to the eastward of her former meridian.

Again, for the distance AD, we have (by rectangular trigonometry) the following proportion, viz.

	deg. min.	
As radius		10.00000
is to the secant of the course	39, 22	10.11176
so is the diff. of lat. AB	90	1.95424
to the distance AD	116.4	2.06600

Case III.—Difference of latitude and distance given, to find course and departure.

Example.—Suppose a ship sails from the latitude of 56 deg. 50 min. north, on a
rhumb between south and wes
miles, and she is then found by obse
tion to be in the latitude of 55 deg. 40
north ; required the course she sailed
and her departure from the meri
(Fig. 5.)

Since the latitudes are both north
the ship sailing towards the equa
therefore,

	deg.
From the lat. sailed from	56
subtract the observed lat.	55
and the remainder	01

equal to 70 miles, is the difference of la-
titude.

By rectangular trigonometry we
the following proportion for findin
angle of the course F, viz.

	deg. min.
As the dist. sailed DF	126
is to radius	
so is the diff. of lat. FD	70
to the co-sine of the course F	56 11

which, because she sails betwee
and west, will be south 56 deg. 1
west, or SW*b*W. Then, for the dep
we have (by rectangular trigono
the following proportion, viz.

	deg. min.
As radius	
is to the dist. sailed DF	126
so is the sine of the course F	56 11
to the departure DE	104.6

consequently she has made 104.
departure westerly.

Case IV.—Difference of lati
departure given, to find cours
tance.

Example.—Suppose a ship sa
the latitude of 44 deg. 50 min.
tween south and east, till she
6¼ miles of easting, and is then
observation to be in the latitude
56 north : required the course

Since the latitudes are both
the ship sailing towards the
therefore,
From the latitude sailed from
take the latitude come to

and there remains
equal to 114 miles, the differ
tude or southing.

In this case (by rectangular
try) we have the following pro
find the course KGL, (fig. 6.)

	deg.
As the diff. of lat. GK	114
is to radius	
so is the departure KL	
to the tangent of course G	

which, because the ship
tween south and east, will
deg. 10 min. east, or SSE¼ ea

Then for the distance,
(by rectangular trigonometry
ing analogy, viz.

	deg.
As radius	
is to the diff. of lat. GK	
so is the secant of the course	
to the distance GL	

consequently the ship ha
SSE¼ east course 130.5 mil

.—Distance and departure given, ourse and difference of latitude.

le.—Suppose a ship at sea sails latitude of 34 deg. 24 min north, north and west, 124 miles, and to have made of westing 86 quired the course steered, and rence of latitude or northing od.

case (by rectangular trigonome- ave the following proportion for e course ADB, fig. 7, viz.

	deg. min.	
istance AD	124	2.09342
us		10.00000
departure AB	86	1.93450
e of the course D	43 54	9.84108

ip's course is north 33 deg. 45 st, or NWbN ¾ west nearly.

for the difference of latitude, we y rectangular trigonometry) the g analogy, viz.

	deg. min.	
s		10.00000
distance AD	124	2.09342
osine of the course	43 54	9.85766
ff. of lat. BD	89.35	1.95108

equal to 1 degree and 29 minutes

e, to find the latitude the ship is both latitudes are north, and sailing from the equator; there-

	deg. min.
latitude sailed from	34 24
difference of latitude	1 29
is	35 53

ude of the ship is in north.

VI.—Course and departure given, distance and difference of latitude.

ple.—Suppose a ship at sea, in ude of 24 deg. 30 min. south, sails ll she has made of easting 96 required the distance and diffe- of latitude made good on that

is case (by rectangular trigonome- by case 2,) we have the follow- portion for finding the distance viz.

	deg. min.	
sine of the course G	33 45	9.74474
e departure HM	96	1.98227
dius		10.00000
istance GM	172.8	2.23753

, for the difference of latitude, we by rectangular trigonometry) the ng analogy, viz.

	deg. min.	
tangent of course	33, 45	9.82489
e departure HM	96	1.98227
dius		10.00000
iff. of lat. GH	143.7	2.15738

o 2 deg. 24 min. nearly. Conse- y, since the latitude the ship from was south, and she sailing wards the south,

	deg. min.
latitude sailed from	24 30
e difference of latitude	2 25
e sum	26 55

atitude she is come to south.

hen a ship sails on several courses ours, the reducing all these into nd thereby finding the course and ce made good upon the whole, is commonly called the resolving of a traverse.

7. At sea they commonly begin each day's reckoning from the noon of that day, and from that time they set down all the different courses and distances, sailed by the ship till noon next day upon the log-board, then from these several courses and distances, they compute the difference of latitude and departure for each course (by Case I. of Plane Sailing); and these, together with the courses and distances, are set down in a table, called the Traverse Table, which consists of five columns; in the first of which are placed the courses and distances; in the two next, the differences of latitude belonging to these courses, according as they are north or south: and in the two last are placed the departures belonging to these courses, according as they are east or west. Then they sum up all the northings and all the southings; and taking the difference of these, they know the difference of latitude made good by the ship in the last 24 hours, which will be north or south, according as the sum of the northings or southings is greatest: the same way, by taking the sum of all the eastings, and likewise of all the westings, and substracting the lesser of these from the greater, the difference will be the departure made good by the ship last 24 hours, which will be east or west according as the sum of the eastings is greater or less than the sum of the westings; then from the difference of latitude and departure made good by the ship last 24 hours, found as above, they find the true course and distance made good upon the whole (by Case IV. of Plane Sailing), as also the course and distance to the intended port.

Of Parallel Sailing.—Since the parallels of latitude do always decrease the nearer they approach the pole, it is plain a degree on any of them must be less than a degree upon the equator. Now in order to know the length of a degree on any of them, let PB (fig. 9) represent half the earth's axis, PA a quadrant of a meridian, and consequently A a point on the equator, C a point on the meridian, and CD a perpendicular from that point upon the axis, which plainly will be the sine of CP the distance of that point from the pole, or the co-sine of CA its distance from the equator; and CD will be to AB, as the sine of CP, or co-sine of CA, is to the radius. Again, if the quadrant PAB is turned round upon the axis PB, it is plain the point A will describe the circumference of the equator whose radius is AB, and any other point C upon the meridian will describe the circumference of a parallel whose radius is CD.

Cor. 1. Hence, (because the circumference of circles are as their radii) it follows, that the circumference of any parallel is to the circumference of the equator, as the co-sine of its latitude is to radius.

Cor. 2. And since the wholes are as their similar parts, it will be, as the length of a degree on any parallel, is to the length of a degree upon the equator, so is the co-sine of the latitude of that parallel, to radius.

arch on the other in miles.

Of Mercator's sailing. Th
ridians do all meet at the
parallels to the equator do c
crease, and that in proport
sines of their latitudes; ye
charts the meridians were
lel to one another, and con
parallels of latitude made
equator, and so a degree of
any parallel as large as a d
equator; also in these chart
of latitude were still represe
are in themselves) equal to
and to those of the equato
means the degrees of longit
creased beyond their just pro
the more so the nearer they
pole, the degrees of latitude
time remaining the same, i
places must be very erroneo
down upon these charts with
their latitude and longitude,
quently their bearing from
very false.

To remedy this inconvenie
still to keep the meridians p
must protract, or lengthen, th
latitude in the same proportion
longitude are, that so the pr
easting and westing may be th
that of southing and northing,
quently the bearings of place
another are the same upon the c
on the globe itself.

Let ABD (fig. 10.) be a qu
meridian, A the pole, D a po
equator, A C half the axis, B
upon the meridian, from whic
perpendicular to AC, and BG p
lar to CD; then BG will be the
BF or CG the co-sine, of BD th
of the point B; draw DE the ta
CE the secant of the arch CD.
demonstrated, that any arch of
is to the like arch of the equat

every where equal to the secant
arch contained between it and the
r.
e, it follows, since the length of
intermediate minute between the
r and any parallel is equal to the
of the latitude, (the radius being
o a minute upon the equator), the
all these lengths, or the distance
parallel on the enlarged meridian
e equator, will be equal to the sum
he secants to every minute con-
between it and the equator.
equently, the distance between any
rallels on the same side of the equa-
equal to the difference of the sums
he secants contained between the
r and each parallel; and the dis-
between any two parallels on con-
des of the equator, is equal to the
the sums of all the secants contain-
ween the equator and each parallel.
e tables of meridional parts given
the writers on this subject, may be
acted the nautical chart, commonly
Mercator's chart.

g. 11. let A and E represent two
upon Mercator's chart, AC the me-
of A, and CE the parallel of lati-
assing through E; draw AE, and
upon AC the length AB equal to
mber of minutes contained in the dif-
e of latitude between the two places,
ken from the same scale of equal
he chart was made by, or from the
r, or any graduated parallel of the
and through B draw BD parallel to
eting AE in D. Then AC will be
larged difference of latitude, AB the
r difference of latitude, CE the dif-
e of longitude, BD the departure, AE
larged distance, and AD the proper
ce, between the two places A and
so the angle BAD will be the course,
E the rhumb-line between them.

oblique sailing. The questions that
e proposed on this head being innu-
ble, we shall only give one as a spe-
n.

sting along the shore, I saw a cape
rom me NNE: then I stood NW *b*
miles, and I observed the same cape
r from me NE *b* E: required the
ce of the ship from the cape at each
n.

ometrically.—Draw the circles NW
gure 17.) to represent the compass,
he meridian, and WE the east and
line, and let C be the place of the
n her first station: then from C set
on the NW *b* W line, CA 20 miles,
A will be the place of the ship in her
d station.
m C draw the NNE line CB, and
A draw AB parallel to the NE *b* E
CD, which will meet CB in B, the
of the cape, and CB will be the dis-
of it from the ship in its first station,
AB the distance in the second: to
which.

calculation:—In the triangle ABC
given AC, equal to 20 miles; the
e ACB equal to 78 deg. 45 min. the
nce between the NNE and NW *b* W
s; also the angle ABC equal to BCD
al to 33 deg. 45 min., the distance
veen the NNE, and NE *b* E lines; and
sequently the angle A, *equal to 67 deg.*
min.

Hence, for CB, the distance of the cape from the ship in her first station, it will be (by oblique trigonometry.)

S. ABC : AC :: S. BAC : CB.

	deg.	min.	
i. e. As the sine of the angle B	33	45	9.74473
is to the distance run AC	20	—	1.30103
so is the sine of BAC -	67	30	9.96562
to CB - - - -	33	26	1.52191

the distance of the cape from the ship at the first station. Then for AB, it will be, (by oblique trigonometry.)

S. ABC : AC :: S. ACB : AB.

	deg.	min.	
i.e. As the sine of B	33	45	9.74474
is to AC - -	20	—	1.30103
so is the sine of C -	78	45	9.99157
to AB - - -	35	31	1.54786

the distance of the ship from the cape at her second station.

Of the Log-line and Compass. The method commonly made use of for measuring a ship's way at sea, or how far she runs in a given space of time, is by the log-line and a half-minute glass. See *Log.*

The meridian and prime vertical of any place cuts the horizon in four points, at 90 deg. distance from one another, viz. north, south, east, and west: that part of the meridian which extends itself from the place to the north point of the horizon is called the north line; that which tends to the south point of the horizon is called the south line; and that part of the prime vertical which extends towards the right hand of the observer when his face is turned to the north, is called the east-line; and lastly, that part of the prime vertical which tends towards the left hand is called the west line; the four points in which these lines meet the horizon are called the cardinal points.

In order to determine the course of the wind, and to discover the various alterations or shiftings, each quadrant of the horizon, intercepted between the meridian and prime vertical, is usually divided into eight equal parts, and consequently the whole horizon into thirty-two; and the lines drawn from the place on which the observer stands, to the points of division in his horizon, are called rhumb-lines; the four principal of which are those described in the preceding paragraph, each of them having its name from the cardinal point in the horizon towards which it tends: the rest of the rhumb-lines have their names compounded of the principal lines on each side of them, as in the figure; and over whichsoever of these lines the course of the wind is directed, that wind takes its name accordingly. See *Compass.*

Concerning currents, and how to make proper allowances. 1. Currents are certain settings of the stream, by which all bodies (as ships, &c.) moving therein, are compelled to alter their course or velocity, or both; and submit to the motion impressed upon them by the current.

Case I. If the current sets just the course of the ship, *i. e.* moves on the same rhumb with it; then the motion of the ship is increased, by as much as is the drift or velocity of the current.

Case II. If the current sets directly against the ship's course, then the motion

at C capes at, or endeavours to sail u
the rhumb C*a*; but by the force of
wind, and surge of the sea, she is obl
to fall off, and make her way good u
the rhumb C*b*; then the angle *a*C*b* is
lee-way; and if that angle is equal to
point, the ship is said to make one p
lee-way; and if equal to two points,
ship is said to make two points lee-w
The quantity of this angle is very unc
tain, because some ships, with the sa
quantity of sail, and with the same g
will make more lee-way than others.

To find the lee-way.—*Thus*, let the sh
wake be set by a compass in the poop,
the opposite rhumb is the true cou
made good by the ship; then the di
rence between this and the course gi
by the compass in the binacle, is the
way required. If the ship is within s
of land, then the lee-way may be exa
found by observing a point on the la
which continues to bear the same wa
and the distance between the point of
compass it lies upon, and the point
ship capes at, will be the lee-way.

Having the course steered, and the l
way given, we may from thence find
true course by the following method,
Let your face be turned directly to
windward; and if the ship has her l
board tacks on board, count the lee-w
from the course steered towards the ri
hand; but if the starboard tacks are
board, then count it from the course ste
ed towards the left hand. Thus, suppo
the wind at north, and the ship lies
within six points of the wind, with
larboard tacks on board, making o
point lee-way; here it is plain that t
course steered is ENE, and the true cour
E*b*N: also suppose the wind is at NN
and the ship lies up within 6½ points of t
wind, with her starboard tack on boar
making 1½ point lee-way; it is evide

the Log-book, with the
working Days' Works at

he Log-Book.

rses	Winds	Observations and Accidents. ☾ — day of —
	North	Fair weather: at four this afternoon I took my departure from the Lizard in the lat. of 5 deg. 00 min. N. it bearing NNE, dist. 5 leagues.
bS	NbE	
W	EbS	The gale increasing, and being under all our sails.
bW	NNE	After 3 this morning, frequent showers with thick weather till near noon.
W	ENE	The variation I reckon to be one point westerly.
¼W	NEbE	

The Log-Book.

Dist	Diff	Lat.	Diff	Long.
	N.	S.	E.	W.
30		46.2		29.4
19		18.6		5.5
49		29.7		45.5
24.5		20.2		20.0
25.5		19.5		19.5
		144.2		125.0

ship, by account, has come
le of 47 deg. 46 min. north,
ered her longitude 2 deg. 5
ly; so this day I have made
l, S. 31 deg. 31 min. W. dis-
iles.
e *Lizard* bore from me N. 31
E. distance 157.4 miles; and
ved the latitude, I found it
he latitude by account. See

in medicine, a reaching, or
nd endeavour to vomit, aris-
oathing of food, excited by
s humour that irritates the

S, in natural history, a ge-
rmes *testacea* class and order

Shell univalve, divided into several departments, communicating with each other by an aperture. There are more than thirty species, separated into sections. A. Spiral, rounded, with contiguous whorls. B. Spiral, rounded, with separated whorls. C. Elongated and straightish. N. pompilius, inhabits the Indian and African oceans; often very large, and finely variegated with brown flexuous streaks, spots, and marks, under the outer covering, which is white; within of a most beautiful pearly gloss. Of this species, the inhabitants of the east make drinking cups. The shell of N. papyraceous is no thicker than paper, and the fish is not fastened to it. When it is to sail, it expands two of its arms on high, and between these supports a membrane which it throws out on this occasion; this serves for its sail: and the two other arms it hangs out of its shell, to serve occasionally either as oars or as a steerage; but this last office is generally served by the tail. If a storm arises, or any thing gives them disturbance, they draw in their legs, and take in as much water as makes them specifically heavier than that in which they float; and they sink to the bottom. When they rise again, they void this water by a number of holes, of which their legs are full.

NAVY, the fleet or shipping of a prince or state. The management of the British navy royal, under the Lord High Admiral, is entrusted to principal officers and commissioners of the navy, who hold their places by patent. The principal officers of the navy are four, viz. the treasurer, comptroller, who attends and controls all payment of wages, is to know the rates of stores, to examine and audite all accounts &c.: surveyor, who is to know the states of all stores, and see wants supplied, to estimate repairs, charge boatswains, &c. with what stores they receive, and at the end of each voyage to state and audite accounts: clerk of the acts, whose business it is to record all orders, contracts, &c.

The commissioners of the navy are five; the first executes that part of the comptroller's duty which relates to the comptrolling the victuallers' accounts; the second another part of the said comptroller's duty, relating to the account of the storekeepers of the yard; the third has the direction of the navy at the port of Portsmouth; the fourth has the same at Chatham; and the fifth at Plymouth.

The victualling of the royal navy is managed by commissioners, who hold their office at Somerset house, Strand.

NAZARENES, a term originally applied to Christians in general, but afterwards to the sect who blended the institutions of the Mozaic law with those of the gospel.

NAZARITES, among the Jews, persons dedicated to the observation of Nazariteship, either for only a short time, or all their lives. All that we find peculiar in the latter, is, that they were to abstain from wine and all intoxicating liquors, and never to shave or cut off the hair of their heads. The first sort of Nazarites were moreover to avoid all defilement; and if they chanced to contract any pollution before the term was expired, they were obliged to begin afresh.

NE ADMITTAS, in law, a writ directed

to the bishop, at the suit of one that is patron of a church, where, on a quare impedit, &c. depending, he is doubtful that the bishop will collate his clerk, or admit the other's clerk, during the suit between them.

NEAT, or NET-WEIGHT, the weight of a commodity alone, clear of the cask, bag, case, or even filth.

NEBULÆ, in astronomy. There are spots in the heavens called nebulæ, some of which consist of clusters of telescopic stars, others appear as luminous spots of different forms. The most considerable is one in the midway between the two stars on the blade of Orion's sword, marked θ by Bayer, discovered in the year 1656 by Huygens; it contains only seven stars, and the other part is a bright spot upon a dark ground, and appears like an opening into brighter regions beyond. Dr. Halley and others have discovered nebulæ in different parts of the heavens. In the "Connoisance des Temps," for 1783 and 1784, there is a catalogue of 103 nebulæ, observed by Messier and Mechain. But to Dr. Herschel we are indebted for catalogues of 2000 nebulæ, and clusters of stars, which he himself has discovered. Some of them form a round compact system, others are more irregular, of various forms, and some are long and narrow. He supposes, that the milky way is the nebulæ of which our sun is one of its component parts.

Dr. Herschel has also discovered other phenomena in the heavens, which he calls *nebulous stars*; that is, stars surrounded with a faint luminous atmosphere of large extent. Those which have been thus stiled by other astronomers, he says, ought not to have been so called, being either mere clusters of stars plainly to be distinguished by his large telescopes, or such nebulous appearances as might be occasioned by a multitude of stars at a vast distance. The milky way consists entirely of stars.

NEBULY, or NEBULEE, in heraldry, is when a coat is charged with several little figures, in form of words, running within one another, or when the outline of a bordure, ordinary, &c. is indented or waved.

NECESSITY, whatever is done by a necessary cause, or a power that is irresistible, in which sense it stands opposed to freedom. The advocates of *philosophical necessity* maintain that the volitions and actions of intelligent agents are produced by causes equally deciding and resistless as those which are admitted to actuate the material system of the universe.

The law charges no man with default where the act is compulsory, and not voluntary, and where there are not a consent and election; and therefore if either there is an impossibility for a man to do otherwise, or so great a perturbation of the judgment and reason as in presumption of law man's nature cannot overcome, such necessity carries a privilege in itself.

NECK, is that slender part situated between the head and the trunk of the body. See *Anatomy*.

NECKERIA, a genus of the class and order cryptogamia musce.

NECROMANCY, a pretend
tion by raising the dead and ex
swers from them.

NECTARINE. See *Amygdal*

NECTARIUM, in botany, is
the corolla, appropriated for
honey, that oozes from the p
Botany.

NECTRIS, a genus of the he
gynia class and order. Calyx
six-parted, coloured; cor. no
permanent; caps. two, super
one-celled, many-seeded. Th
species, N. aquatica. It is a
Guiana.

NECYDALIS, a genus of in
order Coleoptera. Antennæ
four feelers, filiform; shells
the wings, and either na
shorter than the abdomen;
There are about forty specie
sections.

NE *exeat Regno*, is a writ to
person from going out of the ki

NEEDLE, a very common in
ment made of steel, pointed a
and pierced at the other, used
The sizes are from number 1,
to number 25, the smallest. I
nufacture of needles, German
garian steel are of most repute.
ing them, the steel is passed
coal fire, and under a hamme
it out into a cylindrical form.
it is drawn through the holes
drawing-iron, successively, ti
quired the degree of fineness
The wire is then cut in pi
length intended. These pieces
at one end on the anvil, in ord
the head and eye: they are th
the fire to soften them further,
taken out and pierced at each
the flat part of the anvil, with a
of well tempered steel, and
leaden block to bring out, w
puncheon, the little piece of st
ing in the eye. The corners ar
off the square of the heads, and a
filed on each side of the flat o
the point is then formed with
the whole filed over: they
laid to heat red hot in a ch
and when taken out hence,
out into a bason of cold wa
den. When thus hardened,
laid in an iron-shovel on a fir
less brisk in proportion to
ness of the needles; takin
move them from time to time.
to temper them, and take off th
cess. They are then straitene
another with the hammer. Th
cess is the polishing them. T
they take twelve or fifteen
needles, and range them in
against each other on a piece of
ra n sprinkled with emery dust.
dles thus disposed, emery dus
over them, which is again spri
oil of olives; at last the whole i
into a roll, well bound at both e
roll is then laid on a polishing-
over it a thick plank loaded w
which two men work backwar
wards a day and a half, or two
cessively; by which means the
continually agitated by the w

motion of the plank over it, the needles withinside being rubbed against each other with oil and emery, are insensibly polished. They are then taken out, and the filth washed off them with hot water and soap: they are then wiped in hot bran, a little moistened, placed with the needles in a round box, suspended in the air by a cord, which is kept stirring till the bran and needles be dry. The points are then all turned the same way, and smoothed with an emery stone turned with a wheel. They are then done up into packets of two hundred and fifty each.

NEEDLE, *magnetical*, in navigation, a needle touched with a loadstone, and sustained on a pivot or centre: on which playing at liberty, it directs itself to certain points in or under the horizon. The magnetical needle is of two kinds, viz. horizontal and inclinatory.

Horizontal needles are those equally balanced on each side the pivot that sustains them, and which playing horizontally with their two extremes, point out the north and south points of the horizon.

Inclinatory or dipping needle, a magnetical needle, so hung, as that, instead of playing horizontally and pointing out north and south, one end dips or inclines to the horizon, and the other points to a certain degree of elevation above it. See *Compass* and *Magnetism*.

To find the longitude or latitude by the dipping needle. If the lines of equal dip below the horizon be drawn on maps or sea charts from good observations it will be easy from the longitude known, to find the latitude, and from the latitude known to find the longitude, either at sea or land. Suppose, for example, you were sailing along the meridian of London, and found the angle of dip with a needle of one foot to be 75 deg. the chart will show that this meridian and the line of dip meet in the latitude 53 deg. 11 min. which is therefore the latitude sought. Or, suppose you were travelling or sailing along the parallel of London, that is, in 51 deg. 32 min. north latitude, and you find the angle of dip to be 74 deg. The parallel and line of this dip will meet in the map in 1 deg. 46 min. of east longitude from London, which is therefore the longitude sought.

NEEDLE *stone*, in mineralogy, a species of the zeolite family, found in Iceland and Britanny.

NEGATIVE, in general, something that implies a negation. Thus we say, negative quantities, negative signs, negative powers, &c. See *Algebra*.

NEGRO, a name given to a variety of the human species, who are entirely black, and are found in the torrid zone, especially in that part of Africa which lies between the tropics.

NEPA, *water-scorpion*, a genus of insects of the order hemiptera. Snout inflected; antennæ short; wings four, folding cross wise, coriaceous on the upper part; fore legs cheliform; the other four formed for walking. There are 14 species, inhabiting stagnant waters, and preying on the smaller water insects, &c.

NEPENTHES, a genus of the dioecia syngenesia class and order. Cal. four-parted; cor. none; male, filament, one; with many anthers, connected into a peltate head: female, style none; stigma large, peltate four-lobed; capsule four-celled, with many arilled seeds. There is one species, viz. N. distillatoria, a herbaceous plant of Ceylon. The leaves are alternate, partly embracing the stem at their base, and terminated by tendrils, each of which supports a deep, membranous urn, of an oblong shape, and closed by a little valve like the lid of a box. In the morning, the lid is closed, but it opens during the heat of the day, and a portion of the water evaporates; this is replenished in the night, and each morning the vessel is full, and the lid shut.

NEPER's *Rods* or *Bones*, an instrument invented by Neper, whereby the multiplication and division of large numbers are much facilitated.

The construction of Neper's Rods.—Suppose the common table of multiplication to be made upon a plate of metal, ivory, or paste-board, and then conceive the several columns (standing downwards from the digits on the head) to be cut asunder; and these are what we call Neper's rods for multiplication. But then there must be a good number of each: for as many times as any figure is in the multiplicand, so many rods of that species (i. e. with that figure on the top of it) must we have: there must also be as many rods of 0's.

But before we explain the way of using these rods, there is another thing to be known, viz. that the figures on every rod are written in an order different from that in the table. Thus, the little square space, or division, in which the several products of every column are written, is divided into two parts by a line across, from the upper angle on the right to the lower on the left: and if the product is a digit, it is set in the lower division; but the spaces on the top are not divided; also there is a rod of digits, not divided, which is called the index rod, and of this we need but one single rod.

Multiplication by Neper's Rods.—Lay down the index rod; then on the right of it set a rod whose top is the figure in the highest place of the multiplicand: next to this again, set the rod whose top is the next figure of the multiplicand; and so on in order, to the first figure. Then is your multiplicand tabulated for all the nine digits; for in the same line of squares standing against every figure of the index-rod, you have the product of that figure, and therefore you have no more to do but to transfer the products and sum them. But in taking out these products from the rods, the order in which the figures stand obliges you to a very easy and small addition: thus, begin to take out the figure in the lower part, or unit's place, of the square of the first rod on the right: add the figure in the upper part of this rod to that in the lower part of the next, and so on, which may be done as fast as you can look on them. To make this practice as clear as possible, take the following example.

Example.—To multiply 4768 by 185.

Having set the rods together for the

gives in the quotient 356.

Having tabulated the divisor, 6123, you see that 6,123 cannot be had in 2,179; therefore take five places, and on the rods find a number that is equal, or next less to 21,797, which is 18,369; that is, three times the divisor, wherefore set 3 in the quotient, and substract 18,369 from the figures above, and there will remain 3,428; to which add 8, the next figure of the dividend, and seek again on the rods for it, or the next less, which you will find to be five times; therefore set 5 in the quotient, and substract 30615 from 34,228, and there will remain 3,673, to which add 8, the last figure in the dividend, and finding it to be just six times the divisor, set 6 in the quotient.

NEPETA, a genus of the didynamia gymnospermia class and order Nat. ord. verticillatæ. Cor. lower lip with an intermediate segment; crenate; throat reflex at the edge; stamina approximating. There are twenty species, among which is the N. cataria, common catmint, so called because cats are very fond of it. An infusion of it is reckoned a good emmenagogue. It is a native of most parts of Europe, on banks and hedges, chiefly in a calcareous soil.

NEPHELIUM, a genus of the monoecia pentandria class and order. Nat. ord. tricoccæ. Male, calyx five-toothed; cor. none; female calyx four-cleft; cor. none: germs two, with two styles to each; drupes two, muricated, one-seeded. There is but one species, a herb of the East Indies.

NEPHRITE, in mineralogy, a species of the talc genus; it is also called *jade* or *jade-stone*. It was formerly celebrated for its medical virtues. It is of a dark leek-green colour, verging to blue, and is found in Egypt, China, America, the islands in the Pacific Ocean, and in the Siberian mountains, sometimes adhering to rocks, and sometimes in detached

highly phosphorous,
dour to the waves i

NERITA, in natur
the vermes testace
Animal a limax; sh
gibbous, flattish a
semi-orbular semi-lu
versely truncate,
nearly 80 species.

NERIUM, *oleander*
tandria monogynia c
ord. contortæ. Cont
tube terminated by
follicles two, erect.
beautiful evergree
chiefly natives of th
the tinctorium a b
All the neriums are

NERTERIA, a ge
digynia class and ord
four-cleft, superior
seeds solitary. The
found in New Gran

NERVUS, cylindric
ally fibrose in their
posed of clusters o
from the brain, or r
oblongata within the
spinal marrow, and
to every part of the

NESTORIANS, a
followers of Nestor
triarch of Constanti
the year 429, taught
persons in Jesus Ch
the human, which a
statically or substant
cal manner.

NET, a device fo
fowl. The making t
All the necessary to
dles of different sizes
others flat: a pair o
flat scissars, and a w
thread. The strengt
and the size of the
cording to the fishes

times stretched upon the ledges from the waste-trees to the roof-trees, from the top of the forecastle to the poop: and sometimes are laid in the waste of a ship to serve instead of gratings.

NETTLE. See *Urtica*.

NETTLE, *dead*. See *Lamium*.

NEURADA, a genus of the decandria decagynia class and order. Nat. ord. succulentæ. Cal. five parted; petals five, caps. inferior, ten-celled, ten-seeded, prickly. There is but one species, viz. N. procumbens, an annual plant, native of Egypt, Arabia, and Numidia.

NEUROPTERA, the 4th order of insects according to the Linnæan system, so called on account of the nerves and veins in their wings. They have four membranaceous, reticulate wings; tail unarmed. There are seven genera, viz. ephemera, hemerobus, libellula, myrmeleon, panorpa, phryganea and raphidia.

NEUTRAL SALTS, a sort of salts neither acid nor alkaline, but partaking of the nature of both. See *Acid*, *Alkali*, *Chemistry*, *Salts*, *&c.*

NEUTRALIZATION. When two or more substances mutually destroy each other's properties, they are said to neutralize each other. Thus, in a proper combination of acid and alkaline substances, the acid and alkaline properties are destroyed.

NEWEL. See *Architecture*.

NEWT. See *Lacerta Aquatica*.

NEWTONIAN PHILOSOPHY, the doctrine of the universe, or the properties, laws, forces, motions, &c. of bodies, as delivered by Newton.

The chief part of the Newtonian philosophy, as delivered by the author, except his Optical Discoveries, &c. are contained in his Principia, or Mathematical Principles of Natural Philosophy. He founds his system on the following definitions.

1. Quantity of matter is the measure of the same, arising from its density and bulk conjointly. Thus, air of a double density, in the same space, is double in quantity; in a double space, is quadruple in quantity, in a triple space, is sextuple in quantity, &c.

2. Quantity of motion is the measure of the same, arising from the velocity and quantity of matter conjunctly. This is evident, because the motion of the whole is the motion of all its parts; and therefore in a body double in quantity, with equal velocity, the motion is double, &c.

3. The vis insita, vis inertiæ, or innate force of matter, is a power of resisting, by which every body, as much as in it lies, endeavours to persevere in its present state, whether it is of rest, or moving uniformly forward in a right line.

4. An impressed force is an action exerted upon a body, in order to change its state, whether of rest or motion. This onsists in the action only; and re- no longer in the body when the ac- s over.

centripetal force is that by which are drawn, impelled, or any way owards a point, as to a centre. This e considered of three kinds, abso- accelerative, and motive.

he absolute quantity of a centripe- orce is a measure of the same, propor- al to the efficacy of the cause that ur- at to the centre,

7. The accelerative quantity of a centripetal force, is the measure of the same, proportional to the velocity which it generates in a given time.

8. The motive quantity of a centripetal force, is a measure of the same, proportional to the motion which it generates in a given time. This is always known by the quantity of force equal and contrary to it, that is just sufficient to hinder the descent of the body.

After these definitions, follow certain scholia, treating of the nature and distinctions of time, space, place, and motion, absolute, relative, apparent, true, real, &c. After which, the author proposes to shew how we are to collect the true motions from their causes, effects, and apparent differences; and vice versa, how, from the motions, either true or apparent, we may come to the knowledge of their causes and effects. In order to this, he lays down the following axioms or laws of motion.

1st law. Every body perseveres in its state of rest, or of uniform motion in a right line, unless it is compelled to change that state by forces impressed upon it.

2d law. The alteration of motion is always proportional to the motive force impressed, and is made in the direction of the right line in which that force is impressed.

3d law. To every action there is always opposed an equal re-action; or the mutual actions of two bodies upon each other, are always equal, and directed to contrary parts. Thus, whatever draws or presses another, is as much drawn or pressed by that other, &c.

From this axiom, or law, Newton deduces the following corollaries:

1. A body by two forces conjoined will describe the diagonal of a parallelogram, in the same time that it would describe the side by those forces apart.

2. Hence is explained the composition of any one direct force out of any two oblique ones, viz. by making the two oblique forces the sides of a parallelogram, and the diagonal the direct one.

3. The quantity of motion, which is collected by taking the sum of the motions directed towards the same parts, and the difference of those that are directed to contrary parts, suffers no change from the action of bodies among themselves; because the motion which one body loses is communicated to another.

4. The common centre of gravity of two or more bodies does not alter its state of motion or rest by the actions of the bodies among themselves; and therefore the common centre of gravity of all bodies, acting upon each other, (excluding external actions and impediments) is either at rest, or moves uniformly in a right line.

5. The motions of bodies included in a given space are the same among themselves, whether that space is at rest, or moves uniformly forward in a right line without any circular motion. The truth of this is evident from the experiment of a ship; where all motions are just the same, whether the ship is at rest, or proceeds uniformly forward in a straight line.

6. If bodies, any how moved among themselves, are urged in the direction of parallel lines by equal accelerative forces, they will all continue to move among

scribed, all of equal breadth; then the ul
timate ratio of the curve space, and th
sum of the parallelograms, will be a rati
of equality.

Lem. 3. shews, that the same thing i
true when the breadths of the parallelo
grams are unequal.

In the succeeding lemmas it is shewn, i
like manner, that the ultimate ratios o
the sine, chord, and tangent, of arcs infi
nitely diminished, are ratios of equality
and therefore that in all our reasoning
about these, we may safely use the on
for the other: that the ultimate form o
evanescent triangles, made by the arc
chord, or tangent is that of similitude, an
their ultimate ratio is that of equality; an
hence, in reasonings about ultimate ratio
these triangles may safely be used on
for another, whether they are made wit
the sine, the arc, or the tangent. He the
demonstrates some properties of the ordi
nates of curvilinear figures; and shew
that the spaces which a body describe
by any finite force urging it, whethe
that force is determinate and immutabl
or continually varied, are to each othe
in the very beginning of the motion, i
the duplicate ratio of the forces; and las
ly, having added some demonstration
concerning the evanescence of angles o
contact, he proceeds to lay down the ma
thematical part of his system, which de
pends on the following theorems.

Theor. 1. The areas which revolvin
bodies describe by radii drawn to an im
movable centre of force, lie in the sam
immovable planes, and are proportion
to the times in which they are described.

Theor. 2. Every body that moves in an
curve line, described in a plane, and b
a radius drawn to a point either immov
able or moving forward with an unifor
rectilinear motion, describes about th
point areas proportional to the times,

continually drawn off from a rectilinear motion, and retained in her orbit.

Prop. 5. The same thing is true of all the other planets, both primary and secondary, each with respect to the centre of its motion.

Prop. 6. All bodies gravitate towards every planet; and the weights of bodies towards any one and the same planet, at equal distances from its centre, are proportional to the quantities of matter they contain.

Prop. 7. There is a power of gravity tending to all bodies, proportional to the several quantities of matter which they contain.

Prop. 8. In two spheres mutually gravitating each towards the other, if the matter in places on all sides, round about and equidistant from the centres, is similar, the weight of either sphere towards the other, will be reciprocally as the square of the distance between their centres. Hence are compared together the weights of bodies towards different planets; hence also are discovered the quantities of matter in the several planets; and hence likewise are found the densities from those planets.

Prop. 9. The force of gravity, in parts downwards from the surface of the planets towards their centres, decreases nearly in the proportion of the distances from those centres.

These, and many other propositions and corollaries, are proved or illustrated by a great variety of experiments, in all the great points of physical astronomy. *See Gravity, Gravitation, Astronomy.*

NEW *trial*, in law, is not granted upon nice and formal objections, which do not go to the real merits; nor where the scales of evidence hang nearly equal. It is generally upon some misdirection by the judge to the jury, in point of law, where a jury has found a verdict directly against evidence. It is also granted where damages have been given beyond the ordinary measure of justice; and where the party has been surprised by some evidence which he has subsequently the means of answering, but had not at the trial. It is always refused where the damages do not exceed 10*l*.

NICANDRIA, a genus of the decandria monogynia class and order. Calyx turbinate, coloured, four-parted; cor. one-petalled, ten-cleft; germ encircled with a membranaceous ring; stigma peltate, orbicular, six-rayed; berry roundish, six, grooved, three-celled, many seeded. There is one species, *viz.* N. amara, a native of Guiana, where the leaves and stalks are used as an emetic and purgative.

NICKEL. A white metal, which, when pure, is both ductile and malleable. It may be forged into very thin plates, their thickness not being greater than 0.01 of an inch. Its colour is intermediate between that of silver and tin, and is not al-

the air. It is nearly as hard as its specific gravity is 8.279, and ged 8.666. The species of nickel its alloy with arsenic and a little and its oxide. The first is the undant, and the one from which s usually extracted. It is known logists by the German name of kupfer-nickel, or false copper, from its colour and appearance. It occurs generally massive and disseminated; its colour is copper-red of various shades.

By the experiments that have been made, nickel in its pure state possesses a magnetic power. The effect of the magnet on it is very little inferior to that which it exerts on iron; and the metal itself becomes magnetic itself by friction with a magnet, or even by beating with a hammer. Magnetic needles have even been made of it in France, and have been preferred to those of steel, as resisting better the action of the air The nickel preserves its magnetic property when alloyed with copper, though it is somewhat diminished; by a small portion of arsenic it is completely destroyed.

Nickel is fusible at 150 degrees of Wedgwood, and forms alloys with a number of the metals; but our knowledge of these combinations is very imperfect.

NICOTIANA, *tobacco*, a genus of the pentandria monogynia class and order. Nat. ord. luridæ. Corolla funnel form, with a plaited border; stamina inclined; capsule two-valved, two-celled. There are seven species, of which the most remarkable is N. tabacum, or *tobacco*, which see.

NICTITATING *membrane*, in comparative anatomy, a thin membrane, chiefly found in the bird and fish kind, which covers the eyes of these animals, sheltering them from the dust or from too much light; yet is so thin and pellucid, that they can see through it.

NIDUS, among naturalists, a nest, or proper repository for the eggs of birds, insects, &c. wherein the young of these animals are hatched and nursed.

NIGELLA, *fennel flower*, a genus of the polyandria pentagynia class and order. Nat. ord. multisiliquæ. Cal. none; petals five; nectary five, two-lipped, within the corolla; capsule as many, connected. There are five species: annual herbaceous plants.

NIGHT, that part of the natural day during which the sun is underneath the horizon. Night was originally divided by the Hebrews and other eastern nations into three parts or watchings. The Romans, and afterwards the Jews from them, divided the night into four parts, or watches, the first of which began at sun-set, and lasted till nine at night, according to our way of reckoning; the second lasted till midnight; the third till three in the morning; and the fourth ended at sun-rise. The ancient Gauls, Germans, and Saxons, divided their time not by days, but by nights; and the people of Iceland and the Arabs do the same at this day.

NIGHTINGALE. See *Motacilla.*

NIGHTMARE. See *Medicine.*

NIGRINA, a genus of the monogynia, pentandria order and class. Cor. funnel shaped; cal. inflated; stigma obtuse; caps. bilocular.

NIGRINE, in mineralogy, a species of the menachine genus. Colour dark brownish black; it occurs in larger and smaller angular grains; specific gravity 4.5. It is not attracted by the magnet; with borax it melts to a transparent hyacinth red globule.

NIHIL DICIT, a failure in the defendant to put in an answer to the plaintiff's declaration, &c. by the day assigned for that purpose.

NILOMETER, sometimes called *Niloscope*, an instrument used among the ancients to measure the height of the water in the river Nile, in its periodical overflowings. The measure of it was sixteen cubits, this being the height to which it must rise in order to insure the fruitfulness of the country.

NIMBUS, in antiquity, a circle observed on certain medals, or round the head of some emperors, answering to the circles of light drawn around the images of saints.

NINTH, in music, an interval containing an octave and a tone; also a name given to the chord consisting of a common chord with the eighth advanced one note.

NIPA, a genus of the natural order of palms. The male has a spathe; the corolla is six-petalled. The female has a spathe; corolla none; drupes angular. There is one species, a native of the E. Indies. The leaves are used in making mats.

NIPPLES, in anatomy. See *Mammary gland.*

NIPPERS, in a ship, are small ropes about a fathom or two long, with a little truck at one end, and sometimes only a wale-knot. Their use is to help holding off the cable from the main or jeer-capstan, where the cable is so slimy, so wet, and so great, that they cannot strain it, to hold it off with their bare hands.

NISI PRIUS, in law, a commission directed to the judges of assize, empowering them to try all questions of fact issuing out of the courts at Westminster that are then ready for trial by jury. The original of which name is this: all causes commenced in the courts of Westminster-hall are by course of the courts, appointed to be tried on a day fixed in some Easter or Michaelmas term, by a jury returned from the county wherein the cause of action arises; but with this proviso, nisi prius justiciarii ad assisas capiendas venerint: that is, unless before the day prefixed the judges of assize come into the county in question, which they always do in the vacation preceding each Easter and Michaelmas term, and there try the cause. And then, upon return of the verdict given by the jury to the court above, the judges there give judgment for the party to whom the verdict is found.

NISSOLIA, a genus of the decandria order, in the diadelphia class of plants, and in the natural method ranking under the 32d order, papilionaceæ. Cal. quinquedentate; caps. monospermous, and terminated by a ligulated wing. There are two species, trees of Carthagena.

NITIDULA, a genus of insects of the coleoptera order, antennæ clavate, club solid; shells margined, head prominent; thorax a little flattened, margined. There are upwards of 30 species of this genus.

NITRARIA, a genus of the monogynia order, in the dodecandria class of plants, cor. is pentapetalous, with the petals arched at the top; the calyx quinquefid; the stamina 15: fruit a monospermous plum. There is one species, a shrub of Siberia.

NITRATS, in chemistry, salts formed
of the nitric acid, and alkalies, ea
They possess the following proper
luble in water, and capable of c
ing by cooling; when heated to
with combustible bodies, a viole
bustion and detonation is produ
phuric acid disengages from the
which have the odour of nitric ac
heated with muriatic acid, ox
acid is driven off: they are de
by heat, and yield at first ox
There are twelve nitrates, of w
most important is the nitrate of p
nitre. See *Nitric acid.*

NITRE. See *Nitrats.* Nitre
abundantly on the surface of the
India, South America, South A
even in some parts of Spain.
many and France it is obtained
of artificial nitre-beds. These
the refuse of animal and vegetab
undergoing putrefaction, mixed
careous and other earths. It ha
certained, that if oxygen gas be
to azote at the instant of its d
ment, nitric acid is formed. T
to explain the origin of the aci
beds. The azote, disengaged f
putrifying animal substances,
with the oxygen of the air. Th
is probably furnished, partly
by the vegetables and the
nitre is extracted from these
lixiviating the earthy matters
ter, this water, when suffic
pregnated, is evaporated, and
coloured salt obtained, known
name of crude nitre. It consis
common salt, nitrate of lime, and
other salts. The foreign salts
separated by repeated crystalli
by washing the salt repeatedly w
quantities of water; for the for
being more soluble, are taken
Nitre, when slowly evaporated,
ed in six-sided prisms, terminat
sided pyramids; but for most
it is preferred in an irregular
cause in that state it contains le
The specific gravity of nitre, i
taste is sharp, bitterish, and coo
very brittle. It is soluble in sev
its weight of water, at the tempera
60 deg., and in rather less tha
weight of boiling water. When
to a strong heat it melts, and cong
cooling into an opaque mass, wh
been called mineral crystal. Wh
it melts, it begins to disengage o
and by keeping it in a red heat, ab
third of its weight of that gas ma
tained: towards the end of the
azotic gas is disengaged. If the
continued long enough, the salt
pletely decomposed, and pure po
mains behind. It detonates more
ly with combustible bodies than an
nitrates. When mixed with one-th
of its weight of charcoal, and thro
a red-hot crucible, or when cha
thrown into red hot nitre, de
takes place, and one of the most
combustions that can be exhibited
residuum is carbonate of potash.
more violent detonation takes pla
phosphorus is used instead of charc
tre oxydizes all the metals at a re
The composition of nitre, according
was, is

. . . . .	44
h	51.8
r	4.2
	100.0

urnishes the nitric acid in all its
is obtained by decomposing it
s of the sulphuric acid. When
th tartar, it yields a pure carbon-
tash. In the assaying of various
indispensable, and is equally ne-
n the analysis of many vegetable
nal substances. But one of the
portant compounds formed by
nitre is gunpowder. See *Nitric*

C *acid*. The two principal con-
parts of our atmosphere, when in
proportions are capable, under
r circumstances, of combining
ly, into one of the most powerful
e nitric, which consists, accord-
r. Davy, of 70.5 of oxygen, and
zote, or nitrogen. If these gases
in this proportion in a glass tube,
line in diameter over mercury,
ies of electric shocks be passed
them for some hours, they will
ic acid; or, if a solution of pot-
resent with them, nitrate of pot-
be obtained. For all practical
, however, the nitric acid is ob-
om nitrate of potash, from which
lled by sulphuric acid.
arts of pure nitrate of potash
powdered, are to be put into a
rt, and three parts of concentrat-
uric acid cautiously added, tak-
to avoid the fumes that arise.
e retort a tubulated receiver of
acity, with an adopter interpos-
ute the junctures with a mixture
clay, sifted sand, and cut tow.
ubular fix with fat lute a glass
minating in another large receiv-
hich is a small quantity of water,
ou wish to collect the gaseous
, let a bent glass tube from this
communicate with a pneumatic
Apply heat to the receiver by
a sand bath. The first product
es into the receiver is generally
fuming; but the appearances
y diminish, till the acid comes
e, and even colourless, if the ma-
ed were clean.
large way, and for the purposes
rts, extremely thick cast iron or
retorts are usually employed, to
n earthen head is adapted and
ed with a range of proper con-
. The strength of the acid too is
by putting more or less water in
ivers. The nitric acid thus made
ly contains sulphuric acid, and al-
atic from the impurity of the ni-
mployed. If the former, a solu-
nitrate of barytes will occasion a
recipitate: if the latter, nitrate
r will render it milky. The sul-
cid may be separated by a second
on from very pure nitre; equal
t to an eighth of that originally em-
or by precipitating with nitrate of
decanting the clear liquid, and
g it. The muriatic acid may be
d by proceeding in *the same way*
with nitrate of silver, or with litharge, decanting the clear liquor, and redistilling it, leaving an eighth or tenth part in the retort. The acid for the last process should be condensed as much as possible, and the redistillation conducted very slowly.

As this acid still holds in solution more or less nitrous gas, it is not, in fact, nitric acid, but a kind of nitrous: it is therefore necessary to put it into a retort, to which a receiver is added, the two vessels not being luted, but merely joined by paper; and to apply a very gentle heat for several hours, changing the receiver as soon as it is filled with red vapours. The nitrous gas will thus be expelled, and the nitric acid will remain in the retort, as limpid and colourless as water. It should be kept in a bottle secluded from the light, otherwise it will lose part of its oxygen.

Nitric acid should be of the specific gravity of 1.5, or a little more, and colourless. It boils at 248 deg. and may be distilled without any essential alteration. Exposed to the air it absorbs moisture. If two parts be suddenly diluted with one of water, the temperature will rise to about 112deg. but the addition of more water to this diluted acid will lower its temperature. It retains its oxygen with little force, so that it is decomposed by all combustible bodies. Brought into contact with hydrogen gas at a high temperature, a violent detonation ensues; so that this must not be done without great caution. It inflames volatile oils, when suddenly poured on them: but to perform this experiment with safety, the acid must be poured out of a bottle tied to the end of a long stick, otherwise the operator's face and eyes will be greatly endangered. If it be poured on perfectly dry charcoal powder, it excites combustion, with the emission of copious fumes. By boiling it with sulphur it is decomposed, and its oxygen uniting with the sulphur forms sulphuric acid.

The nitric acid is of considerable use in the arts, it is employed for etching on copper; as a solvent of tin to form with that metal a mordant for some of the finest dyes; in metallurgy and assaying; in various chemical processes on account of the facility with which it parts with oxygen and dissolves metals; in medicine as a tonic, and as a substitute for mercurial preparations in syphylis and affections of the liver; as also in the form of vapour to destroy contagion. For the purposes of the arts it is commonly used in a diluted state, and contaminated with the sulphuric and muriatic acids, by the name of aqua fortis. This is generally prepared by mixing common nitre with an equal weight of sulphate of iron, and half its weight of the same sulphate calcined, and distilling the mixture: or by mixing nitre with twice its weight of dry powdered clay, and distilling in a reverberatory furnace. Two kinds are found in the shops, one called double aqua fortis, which is about half the strength of nitric acid; the other simply aqua fortis, which is half the strength of the double.

A compound made by mixing two

tes is apt to vitrify with the earth o
the crucible. It is soluble in 12 parts o
cold and 3 or 4 of boiling water. It i
said to exist in some mineral waters.

The nitrate of potash is the salt wel
known by the name of nitre, or saltpe
tre. It is found ready formed in the Eas
Indies, in Spain, in the kingdom of Na
ples, and elsewhere, in considerabl
quantities; but nitrate of lime is still mor
abundant. Far the greater part of the ni
trate made use of is produced by a com
bination of circumstances which tend t
compose and condense nitric acid. Thi
acid appears to be produced in all situa
tions, where animal matters are complete
ly decomposed with access of air, and o
proper substances with which it can rea
dily combine. Artificial nitre beds ar
made by an attention to the circumstan
ces in which this salt is produced by na
ture. Dry ditches are dug, and covere
with sheds, open at the sides, to keep o
the rain: these are filled with anima
substances, such as dung, or other excre
ments, with the remains of vegetable
and old mortar, or other loose calcareou
earth. Occasional watering, and turnin
up from time to time, are necessary, t
accelerate the process, and increase th
surfaces to which the air may apply; bu
too much moisture is hurtful. When
certain portion of nitrate is formed, th
process appears to go on mor
quickly: but a certain quantity stops i
altogether, and after this cessation th
materials will go on to furnish more
if what is formed be extracted by lixivi
ation.

To extract the saltpetre from the ma
of earthy matter, a number of large cask
are prepared, with a cock at the bottor
of each, and a quantity of straw within, t
prevent its being stopped up. Into thes
the matter is put, together with wood
ashes either strewed at top, or added dur
ing the filling. Boiling water is then pou

ready indicated, it enters into the ition of fluxes, and is extensively ed in metallurgy: it serves to the combustion of sulphur in fa- g its acid; it is used in the art of it is added to common salt for ing meat, to which it gives a red is an ingredient in some frigorific es; and it is prescribed in medi- cooling, febrifuge, and diuretic, ne have recommended it mixed egar as a very powerful remedy sea scurvy.

te of soda, formerly called cubic rangular nitre, approaches in its res the nitrate of potash; but dif- m it in being somewhat more solu- cold water, though less in hot, akes up little more than its own ; in being inclined to attract mois- in the atmosphere; and in crystal- n rhombs, or rhomboidal prisms.

be prepared by saturating soda e nitric acid, by precipitating ni ations of the metals, or of the earths barytes, by soda: by lixiviating stallizing the residuum of common tilled with three-fourths its weight c acid; or by saturating the mother of nitre with soda instead of potash. lt may be used in the composition -works.

ate of strontian may be obtained in ne manner as that of barytes. Ap- o the wick of a candle, or added to g alcohol, it gives a deep red co- the flame. On this account it e useful, perhaps, in the art of py- y.

ate of lime, the calcareous nitre of riters, abounds in the mortar of old ngs, particularly those that have much exposed to animal effluvia, or aces in which azote is set free. It prepared artificially by pouring nitric acid on carbonate of lime. If ution be boiled down to a syrupy ence, and exposed in a cool place, stallizes in long prisms, resembling es of needles diverging from a cen- t might be employed instead of the of potash for manufacturing aqua

nitrate of ammonia possesses the ty of exploding, and being totally posed, at the temperature of 600 whence it acquired the name of *flammans*. The readiest mode of ring it, is by adding carbonate of nia to dilute nitric acid till satura- kes place. If this solution be evapo- in a heat between 70 deg. and 100 and the evaporation not carried too chrystallizes in hexaedral prisms nating in very acute pyramids: if at rise to 212 deg., it will afford, ling, long fibrous silky chrystals.

ate of magnesia, magnesian nitre, tallizes in four-sided rhomboidal s, with oblique or truncated sum- and sometimes in bundles of small es. Its taste is bitter, and very si- to that of nitrate of lime, but less nt. It is fusible, and decomposable at, giving out first a little oxygen hen nitrous oxide, and lastly nitric It deliquesces slowly. It is soluble in an equal weight of cold water, and in but little more hot.

The two preceding species are capable of combining into a triple salt, an ammoniaco-magnesian nitrate, either by uniting the two in solution, or by a partial decomposition of either by means of the base of the other. This is slightly inflammable when suddenly heated: and by a lower heat is decomposed, giving out oxygen, azote, more water than it contained, nitrous oxide, and nitric acid. The residuum is pure magnesia. It is disposed to attract moisture from the air, but is much less deliquescent than either of the salts that compose it; and requires eleven parts of water at 60 deg. to dissolve it. Boiling water takes up more, so that it will chrystallize by cooling. It consists of 78 parts of nitrate of magnesia, and 22 of nitrate of ammonia.

From the activity of the nitric acid as a solvent of earths in analysation, the nitrate of glucine is better known than any other of the salts of this new earth. Its form is either pulverulent or a tenacious or ductile mass. Its taste is at first saccharine, and afterwards astringent. It grows soft by exposure to heat, soon melts, its acid is decomposed into oxygen and azote, and its base alone is left behind. It is very soluble, and very deliquescent.

Nitrate, or rather supernitrate, of alumine, crystallizes, though with difficulty, in thin, soft, pliable flakes. It is of an austere and acid taste, and reddens blue vegetable colours. It may be formed by dissolving in diluted nitric acid, with the assistance of heat, fresh precipitated alumine, well washed, but not dried. It is deliquescent, and soluble in a very small portion of water. Alcohol dissolves its own weight. It is easily decomposed by heat.

Nitrate of zircone was first discovered by Klaproth. Its crystals are small capillary, silky needles. Its taste is astringent. It is easily decomposed by heat, very soluble in water, and deliquescent. It may be prepared by dissolving zircone in strong nitric acid; but like the preceding species, the acid is always in excess.

Nitrate of yttria may be prepared in a similar manner. Its taste is sweetish and astringent. It is scarcely to be obtained in crystals; and if it be evaporated by too strong a heat, the salt becomes soft like honey, and on cooling concretes into a stony mass. Exposed to the air it deliquesces.

NITRITES. Though these salts are composed of nitrous acid and saline bases, yet the only way of obtaining them is by exposing a nitrate to a pretty strong heat, till a quantity of the oxygen is disengaged from it: what remains is a nitrite. These salts are, in general, deliquescent, very soluble in water, decomposable by heat, and by exposure to the air they are gradually converted into nitrates by absorbing oxygen.

NITROGEN. See *Gas*.

NITROUS *acid*. There is no such thing, properly speaking, as nitrous acid; it is the nitric base acidified with a minimum [illegible]

NOT *guilty*, the general issue or plea of the defendant in any criminal action or prosecution; as also in an action of trespass, or upon the case for deceits and wrongs.

NOVEL *assignment*, or new assignment, a term in law pleadings. In actions of trespass, where the form of the declaration being very general, the defendant pleads in bar a common justification; to which the plaintiff replies by stating, that he brought his action as well for a certain other trespass which he states with more particularity, as for that which is justified. This is called a new assignment.

NOVEMBER, the 11th month of the Julian year, consisting of thirty days: it got the name of November, as being the ninth month of Romulus's year.

NOUN, in grammar, a part of speech, which signifies things without any relation to time; as a man, sweet, &c.

NOURISHMENT. See *Physiology*.

NUDE *contract*, *nudum pactum*, a bare promise without any consideration.

NUISANCE, signifies generally any thing that does hurt, inconvenience, or damage to the property or person of another. Nuisances are of two kinds, public and private, and either affect the public or the individual. The remedy for a private nuisance is by action on the case for damages, and for a public nuisance by indictment. It must be done without riot, if at all. Every continuance of a nuisance is a fresh nuisance, and a fresh action will lie.

NUL *tiel record*, the replication which the plaintiff makes to the defendant when the latter pleads a matter of record in bar to the action, and it is necessary to deny the existence of such record.

NUMBER, a collection of several units, or of several things of the same kind, as 2, 3, 4, &c. Number is unlimited in respect of increase; but in respect of decrease it is limited; unity being the first

number, incommens
termed irrational or
manner a rational
whereof unity is an
tional broken numbe
aliquot part of unity
ed number, that co
number and a brok
ber, that which may
equal parts without
&c. An evenly e
which may be me
without any remaind
number, as 4 by 2.
number, when a nu
divided by an uneve
5. Uneven number
an even number, a
which cannot be divi
parts, 3, 5, &c.
numbers, are those o
ty. Prime numb
selves, are those wh
measure besides uni
that whose aliquot p
make the whole num
bers, those whose a
together, make eithe
the whole. These
into abundant and de
in the former case,
parts 6, 4, 3, 2, 1, m
latter case 16, whose
and 1, make but 15.
arising from the m
numbers, as 6, whic
by 2; and these num
sides of the plane.
the product of any n
itself: thus 4, which i
is a square number.
gonous numbers, the
progressions beginnin
where the common
called triangular n
square numbers;
numbers; where 4 h

$$\frac{(a-2)a^3+3a^2-(a-5)a}{6}$$ expresses all e prime pyramidals.

UMBER *of direction*, in chronology, e of the 35 numbers between the Easter limits, or between the earliest and latest day on which it can fall; *i.e.* between the 22d of March and the 25th of April. Thus, if Easter Sunday fall as in the first line below, the number of direction will be as on the lower line.

	March.										April.			
Easter-day..........	22,	23,	24,	25,	26,	27,	28,	29,	30,	31.	1,	2,	3,	&c.
Number of direction	1,	2,	3,	4,	5,	6,	7,	8,	9,	10,	11,	12,	13,	&c.

so on till the number of direction and sum will be so many days in March the Easter-day; if the sum exceed 31, excess will be the day of April. To the number of direction: enter the following table with the dominical letter on the left hand, and the golden number at top; then where the columns meet is the number of direction for that year.

G. N.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Dom. Let.																			
A	29	19	5	26	12	33	19	12	26	19	5	26	12	5	26	12	33	19	12
B	27	13	6	27	13	34	20	13	27	20	6	27	13	6	20	13	34	20	6
C	8	4	7	2	14	35	21	7	28	21	7	28	14	7	21	14	28	21	7
D	19	15	8	22	15	29	22	8	29	15	8	29	15	1	22	15	29	22	8
E	30	16	2	2	16	30	23	9	30	16	9	23	16	2	23	9	30	23	9
F	24	17	3	3	10	31	24	10	31	17	10	24	17	3	24	10	31	17	10
G	25	18	4	25	11	32	18	11	32	18	4	25	18	4	25	11	32	18	11

UMBER, *golden*. See *Chronology*.

UMBER, in grammar, a modification ouns, verbs, &c. to accommodate them e varieties in their objects, considered regard to number.

UMBERS, in poetry, oratory, music, are certain measures, proportions, idences, which render a verse, pe- or song, agreeable to the ear.

JMERAL *letters*, those letters of the abet which are generally used for es, as I, V, X, L, C, D, M.

JMERATION, or *notation*, the art xpressing in characters any num- proposed in words; or of express- in words any number proposed in acters.

JMERICAL, or *numeral*, something nging to numbers, as numerical bra is that which makes use of bers instead of letters of the alpha-

JMIDIA, the *Pintado*, or *guinea-hen*, atural history, a genus of birds of order gallinæ. Bill strong and short, a carunculate cere at the base, in h the nostrils are lodged; head ed with a compressed coloured cal- wattels hanging from the cheeks; hort, and pointing downwards; body kled. There are four species. N. agris, is of the size of a very large . Its native territory is Africa. It is arious, having been often seen in ve- imerous flocks. It is now extreme- mmon in this country. The female many eggs, and secreting her nest, times will suddenly appear with a y of twenty young ones. It is a bird arsh sound, and almost perpetually ing it. The flesh of the young birds ited, and its eggs are thought prefer- to those of the common hen.

NUNCIO, or *Nuntio*, an ambassador from the pope to some catholic prince or state. See *Ambassador*.

NUNCUPATIVE *Will*, denotes a last will or testament, only made verbally, and not put in writing.

NURSERY, is a piece of land set apart for raising and propagating trees and plants, to supply the garden and other plantations.

In a nursery for fruit trees, the following rules are to be observed. 1. That the soil should not be better than that in which the trees are to be planted out. 2. That it ought to be fresh. 3. It ought neither to be too wet, nor too dry, but rather of a middling nature, though of the two extremes, dry is to be preferred. 4. It must be inclosed in such a manner that neither cattle nor vermin may come in; and so as particularly to exclude hares and rabbits. 5. The ground being inclosed, should be carefully trenched about two feet deep, in August. In trenching the ground cleanse it from the roots of all noxious weeds. 6. The season being come for planting, level down the trenches about the beginning of October, and then lay out the ground into quarters, which may be laid out in beds for a seminary, in which you may sow the seeds or stones of fruit. 7. And having provided yourself with stocks, the next year proceed to transplant them: draw a line across the ground, and open a number of trenches exactly straight; then take the stocks out of the seed-beds; in doing which, you should raise the ground with a spade, in order to preserve the roots as entire as possible; prune off the very small fibres, and if there are any that have a tendency to root directly downwards, such roots should be shortened.

Then plant them in the trenches, if they are designed for standards, in rows three feet and a half, or four feet, from each other, and a foot and a half distant in the rows; but if for dwarfs, three feet row from row, and one foot in the row, will be a sufficient distance. These plants should not be headed or pruned at top. If the winter should prove very cold, lay some mulch on the surface of the ground near their roots, taking care not to let it lie too thick near the stems of the plants, and to remove it as soon as the frost is over. In the summer season destroy the weeds, and dig up the ground every spring between the rows. See *Grafting*.

As to timber trees, nurseries should be made upon the ground intended for planting, where a sufficient number of the trees may be left standing, after the others have been drawn out to plant in other places.

NUTATION, in astronomy, a kind of tremulous motion of the axis of the earth, whereby in each annual revolution it is twice inclined to the ecliptic, and as often returns to its former position.

NUT-*galls*, are excrescences formed on leaves of the oak by the puncture of an insect which deposits an egg on them. The best are known by the name of Aleppo-galls, imported for the use of dyers, calico printers, &c. See *Gallic Acid* and *Tannin*.

NUTMEG, the kernel of a large fruit, not unlike the peach, the produce of the *Myristica*, which see.

The nutmeg is separated from its investient coat, the mace, before it is sent over to us. See *Mace*.

The nutmeg, as we receive it, is of a roundish or oval figure, of a tolerably compact and firm texture, but easily cut with a knife, and falling to pieces on a smart blow. Its surface is not smooth, but furrowed with a number of wrinkles, running in various directions, though principally longitudinally. It is of a greyish brown colour on the outside, and of a beautiful variegated hue within. It is very unctuous and fatty to the touch, when powdered, and is of an extremely agreeable smell, and of an aromatic taste, without the heat that attends that kind of flavour in most of the other species. The largest, heaviest, and most unctuous are to be preferred, such as are the shape of an olive, and of the most fragrant smell.

NUTRITION. See *Physiology*.

NYCTANTHES, a genus of diandria monogynia class and order. Nat. ord. sepiariæ. Cor. salver-shaped, with truncated segments; capsule two-celled, margined; seeds solitary. There are seven species, of which N. undulata, wave-leaved Nyctanthes, is a shrub about six feet in height. It is a native of the East Indies, where it is much cultivated on account of the sweetness of the flowers, which are worn by the ladies in their hair.

NYMPH, among naturalists, that state of winged insects between their living in the form of a worm and their appearing in the winged or most perfect state.

NYMPHÆ. See *Anatomy*.

NYMPHÆA, *water-lily*, a genus of the polyandria monogynia class and order. Nat. ord. succulentæ. Calyx four, five or six leaved; corolla many; berry many-celled, truncated; there are six species, of which the most remarkable are: 1. and 2. The lutea and alba, or yellow and white water-lilies; both of which are natives of Britain, growing in lakes and ditches. Linnæus tells us, that swine are fond of the leaves and roots of the former, and that the smoke of it will drive away crickets and blattæ, or cock-roaches out of houses. The root of the second has an astringent and bitter taste, and are used to dye a dark brown colour. 3. The lotus with heart-shaped toothed leaves, a plant thought to be peculiar to Egypt, is mentioned by Herodotus. M. Savary mentions it as growing in the rivulets and on the sides of the lakes; and that there are two sorts or varieties of the plant, the one with a white, the other with a blueish flower. "The calyx (he says) blows like a large tulip, and diffuses a sweet smell, resembling that of the lily. The first species produces a round root like that of a potatoe, and the inhabitants of the banks of the lake Menzall feed upon it. 4. In the East and West Indies grows a species of this plant, named nelumbo by the inhabitants of Ceylon. The flowers, which are large, flesh-coloured, and consist of numerous petals, disposed as in the other species of water-lily, in two or more rows, are held sacred among the Hindoos. It is divided into several distinct cells, which form so many large round holes upon the surface of the fruit, each containing a single seed.

NYSSA, a genus of the polygamia diœcia class and order. Nat. ord. [illegible]ceæ. Calyx, five-parted; corolla none; male, stamens ten: hermaphrodite, stamens five; pistil one; drupe inferior. There are two species, viz. N. integrifolia, mountain tupelo; and N. denticulata, water tupelo; the former of which grows naturally in Pennsylvania, rising to the height of thirty or forty feet, and near two in diameter, leaves of a dark green colour on the upper surface, but light underneath; flowers upon long footstalks, from the base of the young shoots, divided irregularly into several parts, each supporting a small flower. The Virginia water tupelo tree grows naturally in all swamps, or near large rivers in Carolina and Florida, rising with a strong upright trunk to the height of eighty or an hundred feet, dividing into many branches towards the top; the leaves are large, of an oval spear-shaped form; the berries are nearly the size and shape of small olives.

O

O, or o, the fourteenth letter, and fourth vowel of our alphabet, pronounced as in the words, *nose*, *rose*, &c. As a numeral, O is sometimes used for eleven; and with a dash over it, thus

for eleven thousand. In music, the O, or rather a circle, or double CƆ, is a note of time, called by us a semi-breve; and by the Italians, circolo. The O is also used as a mark of triple time, as being the most perfect of all figures.

OAK. See *Quercus*

OAKUM, old ropes untwisted, and pulled out into loose hemp, in order to be used in caulking the seams, tree nails and bends of a ship, for stopping or preventing leaks.

OAR, in navigation, a long piece of wood, made round where it is to be held in the hand, and thin and broad at the other end, for the easier cutting and resisting the water, and consequently moving the vessel, by rowing.

OAT. See *Avena*.

OBELISK, in architecture, a truncated, quadrangular, and slender pyramid, raised as an ornament, and frequently charged either with inscriptions or hieroglyphics.

OBJECT, in philosophy, something apprehended, or presented to the mind, by sensation or by imagination.

OBJECT *glass of a telescope, or microscope*, the glass placed at the end of the tube which is next the object.

OBLATE, flatted, or shortened: as an oblate spheroid, having its axis shorter than its middle diameter, being formed by the rotation of an ellipse about the shorter axis.

OBLIGATION, a bond containing a penalty, with a condition annexed, either for payment of money, performance of covenants or the like.

OBLIGER *in law*, he who enters into obligation; as obligee the person to whom it is entered into.

OBLIQUE, in geometry, something aslant, or that deviates from the perpendicular.

OBLIQUE PLANES. See *Dialling*.

OBLONGATA MEDULLA. See *Anatomy*.

OBOLUS, in antiquity, an antient Athenian coin, worth a penny farthing.

OBOLARIA, a genus of the angiospermia order, didynamia class of plants; ord. personatæ, calyx bifid; cor. campanulated and quadrifid; caps unilocular, bivalved, and polyspermous: the stamina arising from the divisions of the corolla. There is one species a herb of Virginia.

OBSERVATORY, a place destined for observing the heavenly bodies; being generally a building erected on some eminence, covered with a terrace.

The principal instruments for a fixed observatory are, a large fixed quadrant or a circular divided instrument, chiefly for measuring vertical angles; a transit instrument; an equatorial instrument; a chronometer, or regulator; one or more powerful telescopes; a fixed zenith telescope, and a night telescope.

The quadrant, or quarter of a circle, divided into 90 deg. and each degree subdivided into minutes or smaller parts has been made of various sizes; some of them having a radius, even of eight or nine or more feet in length. When these quadrants do not exceed one or two, or at most three feet, in radius, they are generally fixed upon their particular stands, which are furnished with various mechanical contrivances, that are necessary to place the plane of the quadrant perpendicular to the horizon, and for all the other necessary adjustments. But large quadrants are fixed upon a strong wall.

Plate Observatory, &c. (fig. 1) represents a simple construction of a small moveable quadrant, and fig. 2 represents a mural quadrant. Of the quadrant fig. 1. C B is the arch divided into degrees, and generally subdivided into smaller divisions, such as half degrees, or third parts of each degree, &c. The centre of the arch is at A, and the whole is connected together by means of [illegible] bars, as is shewn [illegible] ters ABC, in the [illegible] A, a short axis [illegible] the plane of the [illegible] perpendicular [illegible] AD, which carries the telescope. [illegible] dex generally has a small [illegible] jection, as at E, upon which [illegible] or vernier is marked, by which [illegible] the minutes or smaller parts of [illegible] degree may be discerned. (See [illegible]) The screw P, commonly called [illegible] gent screw, which [illegible] ed to any part of the [illegible] likewise into the [illegible] and is useful for moving the index [illegible] ly, or more accurately than by the immediate application of the hand to the index itself.

Since the index is suspended at one end, viz. at A, if the other end D, happens to be disengaged from the screw P, the lower end D of the index will naturally come down to C, on account of its own weight and that of the telescope. Now in order to avoid this tendency downwards, an arm Y of brass or iron, is frequently affixed to the upper part of the index, which carries the leaden weight Z sufficient to balance the weight of the index and telescope; so that by this means, even when disengaged from the screw P, the index will remain in any situation in which it may be left. The whole frame ABC is supported upon a strong vertical axis FS, the lower part of which turns into the pedestal [illegible], and carries an index SX, which traverses upon the divided horizontal circle [illegible], fixed to the pedestal. This serves to [illegible] the plane of the quadrant in any [illegible].

for a considerable time after. We do not mention the lenses or microscopes that are applied to read off the divisions at E and at X, or to see the coincidence of the plummet-line with a dot marked upon the arc at C, as matters that need no particular description.

In the eye-tube of the telescope AD there are certain slender wires, placed in the focus of the eye-lens, and perpendicular to the axis of the telescope, which enable the observer to distinguish more accurately when an object that is seen through the telescope, reaches the axis of the telescope. When the stars or planets are observed at night, those wires in the eye-tube cannot be seen; therefore, an arm or wire, is fixed occasionally at the end of the telescope, which arm holds a small piece of ivory or card :' set aslant to the axis of the telescope; for, when a lighted candle or lantern is situated at a little distance, and is directed so as to shine upon the above-mentioned ivory or card, the reflection of the light from it into the tube of the telescope will enable the observer to distinguish the wires at the same time that he beholds the celestial objects.

The mural quadrant, fig. 2, is a larger instrument like the above, excepting that it has no stand; and its index is prevented from bending on account of its great length, by means of metallic bars, *d*, *f*, *b*, *c*. This instrument is firmly fixed upon a wall exactly in the plane of the meridian of the observatory, for which purpose it has clamps, screws, and other adjustments. It has likewise a plummet.

The transit instrument consists of a telescope of any convenient length, fixed at right angles to a horizontal axis, which axis is supported at its two extremities; and the instrument is generally situated so that the line of collimation of the telescope may move in the plane of the meridian. The use of this instrument is to observe the precise time of the celestial bodies' passage across the meridian of the observatory.

Fig. 3. exhibits a transit instrument. N o objects, the distance of which is too :at to be observed by the micrometer, as invented by Graham. Let AB (fig. represent an arch of a circle, containing or 12 degrees well divided, having a ong plate CD for its radius, fixed to the iddle of the arch at D: let this radius be plied to the side of an axis HFI, and be oveable about a joint fixed to it at F, so at the plane of the sector may be always rallel to the axis HI; which being parallel to the axis of the earth, the plane of e sector will always be parallel to the ane of some hour-circle. Let a telescope be moveable about the centre C of the ch AB, from one end of it to the other, turning a screw at G, and let the line sight be parallel to the plane of the ctor. Now, by turning the whole instrument about the axis HI, till the plane it is successively directed first to one of e stars and then to another, it is easy to ove the sector about the joint F, into ch a position, that the arch AB, when ed, shall take in both the stars in their ssage, by the plane of it, provided the fference of their declinations does not ceed the arch AB. Then, having fixed e plane of the sector a little to the stward of both the stars, move the telescope CE by the screw G; and observe y a clock the time of each transit over e cross hairs, and also the degrees and inutes upon the arch AB cut by the index at each transit; then in the difference of the arches, the difference of the clinations, and by the difference of the nes, we have the difference of the right censions of the stars.

The dimensions of this instrument are ese: The length of the telescope, or the dius of the sector is 2½ feet; the breadth the radius, near the end C, is 1¼ inch; d at the end D two inches. The breadth the limb AB is 1½ inch; and its length inches, containing ten degrees divided to quarters, and numbered from each d to the other. The telescope carries nonius or subdividing plate, whose ngth, being equal to sixteen quarters a degree, is divided into fifteen equal rts; which, in effect, divides the limb to minutes, and, by estimation, into aller parts. The length of the square is HFI is eighteen inches, and its thickss is about a quarter of an inch; the ameters of the circles are each 5 inches, e thickness of the plates, and the other easures, may be taken at the direction a workman.

Equatorial or portable observatory: an instrument designed to answer a number of useful purposes in practical astronomy, independantly of any particularly observatory; it may be made use of in any steady om and performs most of the useful oblems in the science.

The principal uses of this equatorial e:

1. To find the meridian by one observation only: for this purpose elevate e equatorial circle to the co-latitude of e place, and set the declination-semicircle to the sun's declination for the day d hour of the day required; then move e azimuth and hour circles both at the me time, either in the same or contrary directions, till you bring the centre of the cross hairs in the telescope exactly to cover the centre of the sun; when that is done, the index of the hour circle will give the apparent or solar time at the instant of observation; and thus the time is gained, though the sun is at a distance from the meridian: then turn the hour circle till the index points precisely at twelve o'clock and lower the telescope to the horizon, in order to observe some point there in the centre of your glass, and that point is your meridian mark found by one observation only; the best time for this operation is three hours before or three hours after 12 at noon.

2. To point the telescope on a star, though not on the meridian, in full daylight. Having elevated the equatorial circle to the co-latitude of the place, and set the declination semicircle to the star's declination, move the index of the hour circle till it shall point to the precise time at which the star is then distant from the meridian, found in tables of the right ascension of the stars, and the star will then appear in the glass. Besides these uses peculiar to this instrument, it is also applicable to all the purposes to which the principal astronomical instruments, viz. a transit, a quadrant, and an equal-altitude instrument are applied.

Of all the different sorts of chronometers or timekeepers, a pendulum clock, when properly constructed, is undoubtedly capable of the greatest accuracy; therefore such machines are most recommendable for an observatory. The situation of this clock must be near the meridian, and near the transit instrument; so that the observer, whilst looking through the telescope of any of these instruments, may hear the beats of the clock and count the seconds.

A pretty good telescope placed truly vertical in an observatory, is likewise a very useful instrument; as the aberration of the stars, and latitude of the place, may be observed and determined by the use of such an instrument, with great ease and accuracy.

The night telescope is a short telescope, which magnifies very little; but it collects a considerable quantity of light, and has a very great field of view; it therefore renders visible several dim objects, which cannot be discovered with telescopes of considerably greater magnifying powers; and hence it is very useful for finding out nebulæ, or small comets, or to see the arrangement of a great number of stars in one view.

The principal instruments that are at present used for marine astronomy, or for the purposes of navigation, are that incomparably useful instrument called Hadley's sextant or quadrant, or octant; a portable chronometer; and a good telescope. See *Optics* and *Quadrant*.

OBSIDIAN, in mineralogy, a genus of the pitch-stone family found in nests in the pearl-stone of Hungary. And likewise called Iceland agate. The principal colour is velvet black, but it passes into greenish grey. Specific gravity is about 2.4. It melts into an opaque, grey glass. It contains silica 69, alumina 22, oxide of iron 9.

OBSCURATOR. See *Anatomy*.

[illegible] time a star or planet is hidden from ou sight, by the interposition of the body c the moon, or of some other planet.

OCCULTATION, *Circle of perpetual,* i a parallel in an oblique sphere, as far dis tant from the depressed pole, as the ele vated pole is from the horizon. All th stars between this parallel and the de pressed pole, never rise, but lie con stantly hidden under the horizon of th place.

OCCUPANCY, in law, is a right whic one acquires to a thing by being the fir to gain possession of it.

OCEAN, in geography, that vast collec tion of salt and navigable waters, i which the two continents, the first includ ing Europe, Asia, and Africa, and th last America are inclosed like island The ocean is distinguished into thre grand divisions. 1. The Atlantic Ocean which divides Europe and Africa from America, which is generally about thre thousand miles wide. 2. The Pacific Oce an, or South Sea, which divides Americ from Asia, and is generally about ten thou sand miles over: and 3. The India Ocean, which separates the East Indie from Africa, which is three thousand mile over.

OCHRES, combinations of earths wit the oxide of iron; they are of various co lours, and are principally employed a pigments.

OCHROIT, an earth discovered b Klaproth, between a red and brown co lour; and is capable of combining wit carbonic acid, during its precipitatio from acids by carbonated alkalies, an strongly consolidating a portion of water.

OCHNA, in botany, a genus of the poli andria monogynia class and order. Natu ral order of coadunatæ. Magnoliæ, Jus sieu. Essential character: calyx five-leav ed; corolla five-petalled; berries one seeded, fastened to a large, roundish re ceptacle.

OCHROMA, in botany, a genus of th monadelphia pentandria class and order Natural order of columniferæ. Malva

nbiting; and furnished with
he fore part, placed in two
front. The face of this ani-
broad, depressed, vesicular
and has some sort of resem-
ape kind. They are ex-
lesome to horses, sheep, and
ling their eggs in different
body, and producing very
ars, and sometimes death.
without feet, short, thick,
; and often furnished with
There are twelve species
he animals which they in-

Capital offences are those
offender loses his life; not
e the offender may lose his
ds, be fined, or suffer cor-
ent, or both, but which are
the loss of life.
that function, by virtue of
n has some employment in
nother. An office is a right
y public or private employ-
take the fees and emolu-
ng to it, whether public, as
rates; or private, as of bai-
, &c.
The great officers of the
, are the Lord High Stew-
High Chancellor, the Lord
r, the Lord President of the
ord Privy Seal, the Lord
the Lord High Constable,
all.
commission, are those ap-
King's commission: such
e general to the cornet in-

field, are such as command
ent, as the colonel, lieute-
nd major,
general, are those whose
nds to a body of forces,
veral regiments: such are
enant-generals, major-ge-
adiers.
staff, are such as, in the
ce, bear a white staff, or
other times, on their going
carried before them by a
s-headed: such are the
Lord Chamberlain, Lord

ubaltern, are all those who
ice in the name of subjects
ct under the Earl Marshal,

by the ancient law, signifies
minister of, or attendant
ate. In the canon law, it is
n for him to whom any
ly commits the charge of
urisdiction; and in this
one in every diocese cal-
ncipalis, whom the laws
this kingdom call chancel-
III. 15.
Offin, that part of the sea
from shore, where there
and no need of a pilot to
.
re the young shoots that
roots of plants; which be-
eparated, and planted in
serve to propagate the spe-

OFF-SETS, in surveying, are perpendiculars let fall, and measuring from the stationary lines to the hedge, fence, or extremity of an enclosure.

OGEE, or O. G., a moulding, consisting of two members, the one concave and the other convex; or, of a round and a hollow, like an S.

OGIVE, an arch, or branch of a Gothic vault; which, instead of being circular passes diagonally from one angle to another, and forms a cross with the other arches.

OIL. From the peculiar properties of different oils, they are naturally divided into two kinds, fixed or fat oils, and volatile or essential oils.

Fixed oils are generally liquid, but of a thick, viscid consistence; and in general they are lighter than water. The specific gravity varies from 0.91, which is that of olive oil, to 0.94, that of linseed oil. The boiling point of the fixed oils is not under the temperature of 600 deg. When exposed to cold they congeal, and even chrystallize.

The various purposes to which fixed oils are applied, are too well known to require particular enumeration. They are employed in domestic economy, either as articles of food, and for this purpose are used alone, or in combination with other substances; or they are employed for giving light, by being burnt in lamps. They are used in medicine, either on account of the properties which peculiar oils possesses, or on account of the properties they communicate to other substances with which they are combined. In this state the use of oils is well known in the form of unguents, plasters and liniments. In the arts, fixed oils are of the most extensive utility. They are employed in the fabrication of soaps, for mixing colours in painting, for some kinds of varnish, and for defending substances from the action of air and moisture.

Volatile oils have almost always an acrid, hot, and even burning taste. It is observed that the most acrid vegetable matters do not yield an oil possessed of this quality. The specific gravity of volatile oils is generally less than that of water. Some volatile oils, however, as those of sassafras and canella, have a greater specific gravity. When volatile oils are exposed to heat, they evaporate very readily. They are much more combustible than the fixed oils; and in burning give out a great quantity of smoke, a very bright white flame, and a good deal of heat. They require a greater proportion of oxygen than the fixed oils, and yield a greater quantity of water. Phosphorus and sulphur are soluble in volatile oils. With phosphorus the solution is luminous in the dark, is extremely fetid, and gives out by the force of heat phosphorated hydrogen gas. Some of these oils are employed in medicine. They are used also for the solution of those substances which are to be employed as varnishes; and many of them are used in perfumery. As many of the volatile oils are produced but in small quantity, they are consequently high priced. There is, therefore, some temptation to adulterate them with fixed oils, with cheaper vola-is another class of oils, known under the name of empyreumatic oils, which have different properties from those which have been described. These empyreumatic oils agree in some of their properties with the volatile oils. They combine in small proportion with water, and they are soluble in alcohol; and probably any difference that exists between them is owing to a partial decomposition.

OINTMENT. See *Pharmacy*.

OLAX, a genus of the triandria monogynia class and order of plants. Natural order of sapotæ, Jussieu. Calyx entire; corolla funnel-form, trifid; nectarium four; berry three-celled, many-seeded. There is but one species.

OLDENLANDIA, a genus of the tetrandria monogynia class and order. Natural order of stellatæ. Rubiaceæ, Jussieu. Essential character: calyx fastened to the pericarpium with four awl-shaped teeth at top; corolla one-petalled, four cleft; capsule inferior, two-celled; receptacle free, fastened to the partition by the base only. There are sixteen species.

OLEA, *olive*, a genus of the diandria monogynia class and order. Natural order of sepiariæ. Jasmineæ, Jussieu. Essential character: corolla four-cleft; with sub-ovate segments; drupe one-seeded. There are seven species. The olive seldom becomes a large tree; two or three stems frequently rise from the same root, from twenty to thirty feet in height, putting out branches almost their whole length, covered with a greyish bark.

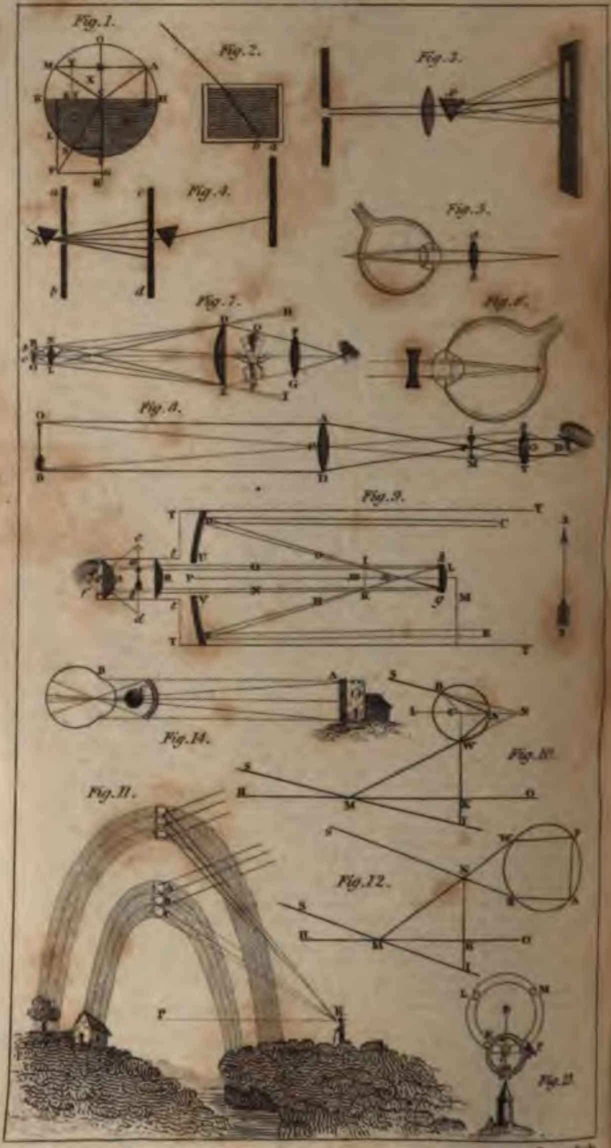
OLERON *laws*, laws relating to maritime affairs, and so called, because made when king Richard I. was at the Isle of Oleron, in Aquitaine.

OLFACTORY *nerves*, the first pair of the head; so called from their being the immediate instruments of smelling.

OLIFIANT *gas*, a name given by the Dutch chemists to carburated hydrogen, or heavy inflammable gas.

OLIGARCHY, a form of government wherein the administration of affairs is

OPTICS.



Cooper sculp.

Published June 1, [illegible], by R. Phillips, Bridge Street, Blackfriars, London.

renders them impervious to ight.

mineralogy, a species of the ly, found in many parts of ecially in Hungary. When of the earth it is soft, but it l diminishes in bulk by ex- e air. The specific gravity 1.9 to 2.5. There are four sub- . the precious, the common, d the wood opal.

M, in natural history, a genus the order coleoptera. Anten- rm, thicker towards the tip; ting from a cavity in the tho- c a little flattened, margined, rginate, longer than the abdo- e are twenty-eight species.

a dramatic composition set to sung on the stage, accompa- musical instruments, and en- magnificent dresses, machines, decorations.

Lass, in optics, so called from theatres, &c. it is sometimes diagonal perspective" from ction. It consists of a tube inches long, in each side of e is a hole exactly against the a plane mirror which reflects lling upon it, to the convex ugh which they are refracted cave eye-glass, whence they rallel to the eye at the hole in

LARIA, in botany, a genus of lria monogynia class and order. character: flower compound; mon, one-leafed, unequally osed by a common receptacle, above, seeding below, falling . There are three species.

UM, in natural history, a genus f the order apodes. Generic the head rather naked; teeth , palate, and throat; gill mem en-rayed; body in the form of a here are four species.

GLOSSUM, in botany, *adder's* genus of the cryptogamia filices order. Natural order of filices, Generic character: capsules , connected by a membrane in- a spike, subglobular, when ripe ransversely, without any elas- seeds very many, extremely mi- ere are nine species.

RHIZA, in botany, a genus of ndria monogynia class and order. rder of stellatæ, Gentianæ, Jus- ential character: corolla funnel- rm bifid; stigmas two; fruit d. There are three species.

XYLUM, in botany, *serpentine* enus of the polygamia monoecia order. Natural order of apoci- sieu. Essential character: her- re, calyx five-cleft; corolla , funnel-form; stamens five; : male, calyx bifid; corolla five- n a funnel form mouth; nectary ; stamens two. There is but es.

A, in botany, a genus of the oc- monogynia class and order. Na- er of onagræ. Jussieu. Essential r: involucre two-*valved*, three-flowered; corolla four-petalled, superior; berry one-celled. There is but one species.

OPHRYS, in botany, a genus of the gynandria diandria class and order. Natural order of orchideæ. Essential character: nectary somewhat keeled underneath. There are are thirty-four species.

OPHTHALMIA, in medicine, an inflammation of the membranes which invest the eye.

OPIUM, in chemistry and medicine, an inspissated gummy juice, which is obtained from the head of the "papaper somniferum." It is imported from Persia, Arabia, and other warm parts of Asia, in flat cakes covered with leaves to prevent their sticking together. It has a reddish brown colour, and strong peculiar smell: its taste at first is nauseous and bitter, but this soon becomes acrid, and produces a slight warmth in the mouth.

OPOPANAX. See *Gum resin.*

OPOSSUM. See *Didelphis.*

OPTICS, the science of vision, including Catoptrics and Dioptrics, and even Perspective; as also the whole doctrine of light and colours, and all the phenomena of visible objects. See *Perspective.*

By a ray of light, is meant the motion of a single particle; and its motion is represented by a straight line. Any parcel of rays proceeding from a point, is called a pencil of rays. By a medium, is meant any pellucid or transparent body, which suffers light to pass through it. Thus, water, air, and glass, are called media. Parallel rays, are such as move always at the same distance from each other. If rays continually recede from each other they are said to diverge. If they continually approach towards each other they are said to converge. The point at which converging rays meet is called the focus. The point towards which they tend, but which they are prevented from coming to, by some obstacle, is called the imaginary focus. When rays, after passing through one medium, on entering another medium of different density, are bent out of their former course, and made to change their direction, they are said to be refracted. When they strike against a surface, and are sent back again from the surface, they are said to be reflected.

A lens, is glass ground into such a form as to collect or disperse the rays of light which pass through it. These are of different shapes, and from thence receive different names. A plano convex is one side flat, and the other convex, A plano-concave is flat on one side, and concave on the other. A double convex, is convex on both sides. A double concave, is concave on both sides, A meniscus, is convex on one side and concave on the other. A line passing through the centre of a lens, is called its axis.

Of Refraction.—If the rays of light, after passing through a medium, enter another of a different density perpendicular to its surface, they proceed through this medium in the same direction as before. But if they enter obliquely to the surface

O K P; draw two diameters
circle, O P, H K, perpendic
each other, draw A D M perp
lar to O P; cut off D T and C
to three-fourths D A; through T
T I S, cutting the circumfer
S; N S drawn from S perp
larly upon O P, will be equal t
or three-fourths. of D A Then if
stuck perpendicularly at A, C,
and the board be dipped in the
far as the line H K, the pin at S
pear in the same line with the p
and C. This shews, that the ray
comes from the pin S is so refract
as to come to the eye along the li
whence the sine of incidence A
the sine of refraction N S, as 4
other pins were fixed along C
would all appear in A C pro
which shews that the ray is ben
surface only The same may be
at different inclinations of the i
ray, by means of a moveable rod
upon the centre C, which alway
the ratio of the sines A D, N S, a
Also the sun's shadow, coincidi
A C, may be shewn to be refracte
same manner. The image L, of
object S, placed under water,
fourth nearer the surface than
ject. And hence the bottom of
river, &c. is one third deeper than
pears to a spectator.

To prove the refraction of lig
different way, take an upright
vessel into a dark room; make
hole in the window shutter, so
beam of light may fall at the bott
(fig. 2) where you may make a
Then fill the bason with water,
moving it out of its place, and y
see that the ray, instead of falling
will fall upon *b*. If a piece of
glass be laid in the bottom of the
the light will be reflected from
will be observed to suffer the sa
fraction as in coming in; only in
trary direction. If the water be

ly intermixing at their juncture.
rder, beginning from the side of
acting angle of the prism, is red,
yellow, green, blue, purple, vio-
he obvious conclusion from this
ment is, that the several component
f solar light have different degrees
ngibility, and that each subsequent
the order above mentioned is more
gible than the preceding.
circular image would be depicted
solar ray unrefracted by the prism,
h ray that suffers no dilatation by the
would mark out a circular image.
it appears, that the spectrum is
ed of innumerable circles of dif-
colours. The mixture, therefore,
ortionable to the number of circles
together, but all such circles are
together, whose centres lie be-
ose of two contingent circles, con-
ly the mixture is proportionable
erval of those centres, *i.e.* to the
of the spectrum. If therefore
th can be diminished, retaining
th of the rectilinear sides, the
will be lessened proportion-
this is done by the following pro-

nsiderable distance from the
ace a double convex lens, (fig. 3)
al length is equal to half that dis-
d place the prism *x* behind the
distance behind the lens, equal
nce of the lens from the hole,
rmed a spectrum, the length of
ctilinear sides is the same as be-
its breadth much less; for the
ished breadth was equal to a line
ng, at the distance of the spec-
m the hole, an angle equal to the
t diameter of the sun, together
ne equal to the diameter of the
at the reduced breadth is equal to
neter of the hole only; the image
ole formed by the lens at the dis-
f double its focal length, is equal to
e; therefore, its several images in
ferent kinds of rays are equal to the
i.e. the breadth of the reduced
um is equal to the diameter of the

rism placed in an horizontal position
project the ray into an oblong
apply another horizontal prism,
r to the former, to receive the re-
d light emerging from the first,
ving its refracted angle turned the
ry way from that of the former. The
after passing through both prisms,
ssume a circular form, as if it had
en at all refracted.
e light emerging from the first
be received by a second, whose
perpendicular to that of the former,
be refracted by this transverse
into a position inclined to the for-
he red extremity being least, and
let most removed from its former
n; but it will not be at all altered in
h.
e to the prism A, (fig. 4), place a
sted board *ab*, and let the refracted
ving passed through the small hole
ived on a second board *cd*, parallel
irst, and perforated in like manner:
that hole in the second board place
n, with its refracting angle down-

ward, turn the first pris it its
axis, and the light will m own
the second board, let the ran-
mitted successively, and places
of the different coloure n the wall
after their refraction by nd prism,
the red will appear lo he violet
highest, the rest in the diate pla-
ces in order. Here the being
very much simplified, a nces
of all the rays on the sec actly
the same; the red wa cted,
the violet most, &c.

The permanency of these original co-
lours appears from hence, that they suf-
fer no manner of change by any number of
re s is evident from the last
m xperiment; nor yet by reflec-
tion any coloured body be placed
ed homogeneous light it will
f the same colour of the
laced, whether that
body or not;
milion be plac-
ed d; in
a , blue,
be that a
he t of its
tha her; a om this
t the of na bodies
arise from an a n them to reflect
some rays more sly and strongly
than others; but lest this phenomenon should produce a doubt of the constancy of the primary colours, it is proper to assign the reason of it, which is this: that when placed in its own coloured light, the body reflects the rays of the predominant colour more strongly than any of those intermixed with it; therefore the proportion of the rays of the predominant colour to those of the others, in the reflected light, will be greater than in the incident light; but when the body is placed in a light of a different colour from its own, for a similar reason the contrary effect will follow, *i.e.* the proportion of the predominant colour to the others will be less in the reflected than in the incident light, and therefore as its splendor would be greater in the former case, and would be less in the latter than if all the rays were equally reflected, the splendour of the predominant colour will be much greater in the former case than in the latter.

White is compounded of all the primary colours mixed in their due proportions, for if a solar ray be separated by the prism into its component parts, and at a proper distance, a lens be so placed as to collect the diverging coloured rays again into a focus, a paper placed perpendicularly to the rays in this point will exhibit whiteness.

The same conclusion may be drawn from the experiment of mixing together paints of the same colours as the parts of the spectrum, and in the same proportion; the mixture will be white, though not of a resplendent whiteness, because the colours mixed are less bright than the primary ones: this may likewise be proved, by fixing pieces of cloth of all the seven different colours, on the rim of a wheel, and whirling it round with great velocity, it will appear to be white. Though seven different colours are distinguishable in the prismatic spectrum, yet, upon examining the matter with more accuracy, we shall see that there are, in fact, only three original colours, red, blue, and yellow; for the orange being situated between the red and yellow, is only the mixture of these two: the green, in like manner, arises from the blue and yellow; and the violet from the blue and red.

As the colour of a body, therefore, proceeds from a certain combination of the primary rays which it reflects; the combination of rays flowing from any point of an object will, when collected by a glass, exhibit the same compound colour in the corresponding point of the image. Hence appears the reason why the images formed by glasses have the colours of the object which they represent.

Vision.—Objects presented to the eye have their images painted on the back part of the retina, the rays of the incident pencils converging to their proper foci there by the refraction of the different humours; and for this office they are admirably adapted; for as the distance between the back and front of the eye is very small, and the rays of each of the pencils that form the image fall parallel, or else diverging on the eye, a strong refractive power is necessary for bringing them to their foci at the retina; but each of the humours, by its peculiar form and density, contributes to cause a convergence of the rays: the aqueous from its convex form; the crystalline by its double convexity and greater density than the aqueous; and the vitreous by a less density than the crystalline joined to its concave form.

The structure of the eye is in general adapted to the reception of parallel rays, but as the distances of visible objects are various, so the eye has powers of accommodating itself to rays proceeding from different distances by altering the distances of the crystaline from the retina, which is done by the action of the ciliary ligaments.

Defective sight arises from an incapacity of altering the position of the crystalline within the usual limits. 1. When it cannot be brought close enough to the cornea, near objects appear indistinct; to this defect people in years are generally subject. 2. Where the crystalline cannot be drawn sufficiently near to the retina, remote objects appear indistinct; this is the defect under which short sighted people labour. In each of these cases the images of the different points in the object would be diffused over small circles on the retina; and so being intermixed and confounded with each other, would there form a very confused picture of the object: for in the former case (fig. 5) the image of any point would be formed behind the retina, as the refraction of the eye is not sufficiently strong to bring the rays (diverging so much as they do in proceeding from a near point) to a focus at the retina. This defect will therefore be remedied by a convex glass *ab*, which makes the point whence the rays now proceed more distant than the object; therefore the rays falling on the eye will now diverge less than before, or else be parallel, and will of course be brought to a nearer focus, viz. at the retina.

In the latter case, the image is formed before the retina, (fig. 6.) because the refractive power of the eye is too great to permit rays so little diverging (as they do in proceeding from a distant point) to reach the retina before they are collected into a focus: in this case the defect is supplied by a concave glass, which makes the point whence the rays diverge, nearer than the object; consequently, the rays falling on the eye will now diverge more than before, so as when refracted through the humours not to come to their focus before they reach the retina. Therefore, spectacles are constructed concave for short-sighted, and convex for long-sighted people.

Optical instruments.—The impediments to the vision of very near objects arise from too great a divergence of the rays in each pencil incident on the eye, and are remedied by the microscope.

Microscopes. — The most powerful single microscopes are very small globules of glass, which any curious person may make for himself by melting the ends of fine threads of glass in the flame of a candle; or by taking a little fine powdered glass on the point of a very small needle, and melting it into a globule in that way. It was with such microscopes as these that Lewenhoek made all his wonderful discoveries, most of which are deposited in the British Museum.

The double or compound microscope differs from the preceding in this respect, that it consists of at least two lenses, by one of which an image is formed within the tube of the microscope, and this image is viewed through the eye-glass, instead of the object itself, as in the single microscope. In this respect the principle is analogous to that of the telescope, only that, as the latter is intended to view distant objects, the object-lens is of a long focus, and consequently of a moderate magnifying power, and the eye-glass of a short focus, which magnifies considerably the image made by the object lens. Whereas the microscope being intended only for minute objects, the object-lens is consequently of a short focus, and the eye-glass in this case is not of so high a magnifying power.

A single figure will serve to explain the principles on which all these instruments are constructed. Suppose therefore LN (fig. 7.) to be the object-lens, and FG to be the eye-glass. The object OB is placed a little beyond the principal focus LA. The cones or pencils of rays then proceeding from the different points of the object are by the lens made to converge to their respective foci, and form an inverted image of the object at PQ. This image is seen through the eye-glass FG, and the rays of each pencil will proceed in a parallel direction to the pupil of the eye.

The solar microscope is a kind of camera obscura, which, in a darkened chamber, throws the image on a wall or screen. It consists of two lenses fixed opposite a hole in a board or window-

; one, which condenses the light
sun upon the object (which is plac-
ween them), and the other which
he image. There is also a plain
r placed without, moved by a
and pinion, which may be so re-
as to throw the sun's rays upon
er lens. Mr. Adams's most inge-
vention, the lucernal microscope,
o be considered as a kind of ca-
scura; only the light in this lat-
proceeds from a lamp, instead
the sun, which renders it conve-
be used at all times. But for
iption of this elegant and most
instrument, we must refer to
roscopical Essays.

copes.—From what has been said
nature of the compound micro-
he principle of the telescope may
ly understood. Telescopes are,
r, of two kinds: the one depend-
the principle of refraction, and
he dioptric telescope; the other
rinciple of reflection, and there-
med the reflecting telescope.

arts essential to a dioptric tele-
e, the two lenses AD and EY (fig.
the compound microscope, AD is
ct-glass, and EY is the eye-glass;
se glasses are so combined in the
at the focus F of the one is ex-
incident with the focus of the

OB then represent a very distant
from every point of which pencils
will proceed so little diverging to
ject-lens AD, that they may be
red as nearly parallel; IM will
the image which would be form-
seen by the action of the lens A
supposing OA and BD two pen-
ays proceeding from the extreme
of the object, they will unite in
point F, and intersect each other.
point F is also the focus of the
s EY; and therefore the pencil of
stead of going on to diverge, will
ough it in nearly a parallel direc-
as to cause distinct vision.

hen plain that, as in the compound
ope, it is the image which is here
plated; and this will account for
mon sensation when people say
ject is brought nearer by a tele-
For the rays, which after crossing
in a divergent state, fall upon the
, as if they proceeded from a real
uated at F. All that is effected
lescope, then, is to form such an
of a distinct object, by means of
ect-lens, and then to give the eye
sistance as is necessary for view-
image as near as possible; so
angle it shall subtend at the eye
e very large compared with the
which the object itself would sub-
the same situation. This is ef-
by means of the eye glass, which
the pencils of rays, so that they
brought to their several foci by
nours of the eye, as has been de-

plain clearly, however, the rea-
y it appears magnified, we must
ave recourse to the figure. OB
at a great distance, the length of
scope is inconsiderable with respect to it. Supposing, therefore, the eye viewed it from the centre of the object glass C, it would see it under the angle OCB: let OC and BC then be produced to the focus of the glass, they will then limit the image IM formed in the focus. If then two parallel rays are supposed to proceed to the eye-glass EY, they will be converged to its focus H; and the eye will see the image under the angle EHY. The apparent magnitude of the object seen by the naked eye is, therefore, to that of the image which is seen through the telescope, as the magnitude of the angle OCB, or ICM, to that of EHY, or IGM. Now the angle IGM is to ICM as

FG; that is, as the focal length of
ect-glass to that of the eye-glass.
nifying power of these glasses
mented to a considerable de-
he focal length of the ob-
respect to that of the eye-
ma greatly increased. This

however would require a tube of immense length; because an eye-glass of a very short focus would cause such a dispersion of the rays of light, particularly towards the edges of the glass, that the view would be intercepted by the prismatic colours.

Another manifest defect in these telescopes is, that the image appears inverted; this, however, is of no consequence with respect to the heavenly bodies; and on this account it is still used as an astronomical telescope. One of almost a similar construction is also used on board of ships as a night glass, to discover rocks in the ocean, or an enemy's fleet. Notwithstanding the inconvenience of exhibiting the objects inverted, more glasses than two cannot be employed from the paucity of light; and habit soon enables the persons who use them to discern objects with tolerable distinctness.

The brightness of the appearance through any of these telescopes or microscopes, depends chiefly on the aperture of the object-glass. For if the whole of that glass was covered except a small aperture in the middle, the magnitude of the image would not be altered; but fewer rays of every pencil being admitted, the object would appear obscure.

In few words the apparent distinctness or confusion of any object, viewed through glasses, depends on the mutual inclination of the rays in any one pencil to each other, when they fall on the eye; the apparent magnitude depends upon the inclination of the rays of different pencils to each other; the apparent situation depends upon the real situation of the extreme pencils: and the apparent brightness or obscurity depends on the quantity of rays in each pencil.

The well-known property in concave speculums, of causing the pencils of rays to converge to their foci, and there forming an image of any object that may be opposed to them, gave rise to the reflecting telescope. In this the effect is precisely the same as that produced by the dioptric telescope; only that in the one case it is produced by reflected, and in the other by refracted, light. Reflecting

and so fixed to a strong wire
may be removed further from the gr
mirror, or nearer to it, by means o
long screw in the inside of the tube, ke
ing its axis still in the same line
with that of the great one. Now, sinc
viewing a very remote object, we
scarcely see a point of it but what is
least, as broad as the great mirror,
may consider the rays of each pe
which flow from every point of the obj
to be parallel to each other, and to co
the whole reflecting surface DUVF.
to avoid confusion in the figure, we s
only draw two rays of a pencil flov
from each extremity of the object
the great tube; and trace their prog
through all their reflections and re
tions to the eye *f* at the end of the s
tube *tt*, which is joined to the great on

Let us then suppose the object A
be at such a distance, that the rays C
flow from its upper extremity A,
the rays E from its lower extremit
then the rays C falling parallel
the great mirror at D, will be thenc
flected converging in the direction
and by crossing at I in the principal
in the mirror, they will form the l
extremity of the inverted image I
milar to the upper extremity A of th
ject AB; and passing on to the con
mirror L (whose focus is at *n*), they
fall upon it at *g*, and be thence refle
converging in the direction *g*N, bec
gm is longer than *gn*; and passing thr
the hole P in the large mirror, they w
meet somewhere about *r*, and form
upper extremity, *a* of the erect imag
similar to the upper extremity A o
object AB. But by passing throug
plano-convex glass R in their way,
form that extremity of the image
In the same manner the rays E,
come from the bottom of the objec
and fall parallel upon the great m
at F, are thence reflected, conve

e found to be decompounded
ig surfaces, we can no longer
ed at the changes produced in
by the intervention of another.
colours which gild the rising
ng sun, must necessarily differ
: which adorn its noon-day
There must be the greatest
ich the liveliest fancy can ima-
clouds will assume the most
orms, or will lour with the
es, according to the different
are reflected to our eyes, or
y absorbed by the vapours in
ie ignorant multitude will ne-
e alarmed by the sights in the
by the appearance at one time
t another of five suns; of cir-
ous magnitudes round the sun
and thence conceive that some
e must take place in the phy-
e moral world, some fall of em-
emendous earthquake: while
a contemplates them merely as
l and beautiful effects produced
or vapour in various masses
ays of light.
ie most beautiful and common
pearances deserves particular
on, as, when this subject is well
l, there will be little difficulty
ng for others of a similar na-
ndant on the different refran-
he rays of light. Frequently,
backs are turned to the sun,
is a shower either around us,
distance before us, a bow is
e air, adorned with all or some
en primary colours. The ap-
of this bow, in poetical language
ie iris, and in common language
w, was an inexplicable mystery
ents; and, though now well
d, continues to be the subject
ion to the peasant and the phi-

indebted to Sir Isaac Newton
planation of this appearance;
ious easy experiments we may
any man that his theory is
n truth. If a glass globe is
l in the strong light of the sun,
found to reflect the different
colours exactly in proportion to
n in which it is placed; in other
reeably to the angle which it
a the spectator's eye and the in-
the rays of light. The fact is,
ierable pencils of light fall upon
e of the globe, and each of these
ed as by a prism. To make this
i clearer, let us suppose the cir-
fig. 10) to represent the globe, or
ain, for each drop may be con-
a small globe of water. The
t is well known, are least re-
; they will therefore be refract-
ibly to their angle of incidence,
n point A in the most distant
e globe; the yellow, the green,
and the purple rays, will each
ed to another point. A part of
is refracted, will be transmitted,
will also be reflected; the red
e point A, and the others at
her points, agreeably to their
efraction.
ry evident that if the spectator's
eye is placed in the direction of MW, or the course of the red-making rays, he will only distinguish the red colour; if in another situation, he will see only by the yellow rays; in another by the blue, &c. but as in a shower of rain there are drops at all heights and all distances, all those that are in a certain position with respect to the spectator will reflect the red rays, all those in the next station the orange, those in the next the green, &c.

To avoid confusion let us, for the present, imagine only three drops of rain, and three degrees of colours in the section of a bow (fig. 11). It is evident that the angle CEP is less than the angle BEP, and that the angle AEP is the greatest of the three. This largest angle then is formed by the red rays, the middle one consists of the green, and the smallest is the purple. All the drops of rain, therefore, that happen to be in a certain position to the eye of a spectator, will reflect the red rays, and form a band or semicircle of red; those again in a certain position will present a band of green, &c. If he alters his station, the spectator will still see a bow, though not the same bow as before; and if there are many spectators they will each see a different bow, though it appears to be the same.

There are sometimes seen two bows, one formed as has been described, the other appearing externally to embrace the primary bow, and which is sometimes called a secondary or false bow, because it is fainter than the other; and what is most remarkable is, that in the false bow the order of the colours appears always reversed.

In the true or primary bow we have seen that the rays of light arrive at the spectator's eye after two refractions and one reflection; in the secondary bow the rays are sent to our eyes after two refractions and two reflections, and the order of the colours is reversed, because in this latter case the light enters at the inferior part of the drop, and is transmitted through the superior. Thus (fig. 12) the ray of light which enters at B is refracted to A, whence it is reflected to P. and again reflected to W. where, suffering another refraction, it is sent to the eye of the spectator. The colours of this outer bow are fainter than those of the other, because the drop being transparent, a part of the light is transmitted, and consequently lost at each reflection.

The phenomenon assumes a semicircular appearance, because it is only at certain angles that the refracted rays are visible to our eyes. The least refrangible, or red rays, make an angle 42 degrees two minutes, and the most refrangible or violet rays an angle of 40 degrees 17 minutes. Now if a line be drawn horizontally from the spectator's eye, it is evident that angles formed with this line, of a certain dimension in every direction will produce a circle; as will be evident, by only attaching a cord of a given length to a certain point, round which it may turn as round its axis, and in every point will describe an angle with the horizontal line of a certain and determinate extent.

Let HO, for instance (fig. 12) represent the horizon on both sides, and the po W will describe the arc of a circle : a all the drops placed in its circumferen will have the property we have mentic ed, of transmitting to the eye a particul colour. When the plane HMWA is pe pendicular to the horizon, the line M is directed to the vertex of the bow, a WK is its altitude.

This altitude depends on two thing the angle between the incident and eme gent rays, and the height of the sun abov the horizon; for since SM is parallel SN, the angle SNM is equal to NMI: b SMH, the altitude of the sun, is equal KMI; therefore the altitude of the bov WMK, which is equal to the differenc between WMI and KMI, is equal to th difference between the angles made b the incident and emergent rays and th altitude of the sun.

The angle between the incident an emergent rays is different for the differ ent colours, as was already intimated for the red, or least refrangible, rays, it i equal to 42 deg. 2 min.: for the violet, or most refrangible, it is equal to 40 deg. 1 min.: consequently when the sun is more than 42 deg. 2 min. above the horizon, the red colour cannot be seen; when it is above 40 deg. 17 min. the violet colour cannot be seen.

The secondary bow is made in a similar manner: but the sun's rays suffer, in this case, two reflections within the drop. The ray SB (fig. 12) is decompounded at B; and one part is refracted to A, thence reflected to P, and from P reflected to W, where it is refracted to M. The angle between the incident and emergent rays SNM is equal as before to NMI: and NMK, the height of the bow, is equal to the difference between the angle made by the incident and emer-

e was observed, in which the
ie colours was white, red, blue,
d a bright red on the outside.
l coronas may be made in cold
by placing a lighted candle in
t of a cloud of steam; or if a
ow is breathed upon, and the
candle placed at some distance
vindow, while the operator is
distance of some feet from ano-
of the window, the flame will
ided with a coloured halo.
helia, or mock suns, are the
idid appearances of this kind.
helia generally appear about the
true sun, not quite so bright,
ey are said sometimes to rival
t luminary in splendour. When
number of them they are not
ach other in brightness. Exter-
are tinged with colours like the
They are not always round,
ometimes a long fiery tail op-
sun, but paler towards the ex-
Dr. Haller observed one with
ding both ways. Mr. Weidler
rhelion with one tail pointing
other downward, a little crook-
mb which was farthest from the
of a purple colour, the other
h the colours of the rainbow.
generally accompany parhe-
coloured, and others white.
also, in general, a very large
cle, parallel to the horizon,
sses through all the parhelia;
was entire, would go through
of the sun: sometimes there
of smaller circles concentric to
touching the coloured circles
round the sun; they are also
th colours, and contain other

he most remarkable appearan-
kind was that which was ob-
Rome by Scheiner, as intimat-
; and this may serve as a suffi-
nce of the parhelion.
ebrated phenomenon is repre-
(fig. 13.) in which A is the
the observer, B his zenith, C
un, and AB a plane passing
e observer's eye, the true sun,
nith. About the sun C there
two concentric rings, not com-
diversified with colours. The
em DEF, was fuller and more
nd though it was open from D
those ends were perpetually
ring to unite, and sometimes
. The outer of these rings was
ter, so as scarcely to be discern-
ad, however, a variety of co-
was very inconstant. The third
MN, was very large, and en-
e, passing through the middle
, and every where parallel to
n. At first this circle was en-
owards the end of the pheno-
was weak and ragged, so as
e perceived from M towards N.
tersection of this circle and the
ris GKI, there broke out two
or mock suns, N and K, not
ect, K being rather weak, but
brighter and stronger. The
of the middle of them was
like *that of the sun; but* towards the edges they were tinged with colours like those of the rainbow, and they were uneven and ragged. The parhelion N was a little wavering: and sent out a spiked tail NP, of a colour somewhat fiery, the length of which was continually changing.

The parhelia at L and M, in the horizontal ring, were not so bright as the former, but were rounder, and white, like the circle in which they were placed. The parhelion N disappeared before K; and while M grew fainter, K grew brighter, and vanished the last of all.

It is to be observed farther, that the order of the colours in the circles DEF, GKN, was the same as in the common halos, namely, red next the sun; and the diameter of the inner circle was also about 45 deg., which is the usual size of a halo.

Parhelia have been seen for one, two, three, and four hours together; and in North America they are said to continue some days, and to be visible from sun-rise to sun-set. When they disappear it sometimes rains, or snow falls in the form of oblong spiculæ.

Mr. Wales says, that at Churchill, in Hudson's-bay, the rising of the sun is always preceded by two long streams of red light. These rise as the sun rises; and, as they grow longer, begin to bend towards each other, till they meet directly over the sun, forming there a kind of parhelion, or mock sun.

These two streams of light, he says, seem to have their source in two other parhelia, which rise with the true sun; and in the winter season, when the sun never rises above the haze or fog which he says is constantly found near the horizon, all these accompany him the whole day, and set with him in the same manner as they rise. Once or twice he saw a fourth parhelion under the true sun; but this he adds, is not common.

The cause of these is apparently the reflection of the sun's light and image from the thick and frozen clouds in the northern atmosphere, accompanied also with some degree of refraction. To enter upon a mathematical analysis of these phenomena would be only tedious, and very foreign to our purpose. From what has been said upon this subject it is evident, that all the phenomena of colours depend upon two properties of light, the refrangibility and reflexibility of its rays.

Of the inflection of light.—The direction of the rays of light is changed, as we have seen, in their approach to certain bodies, by reflection and refraction; and consequently we must admit that there is some power in these bodies by which such effects are universally produced. If reflection was produced simply by the impinging of particles of light on hard or elastic bodies, or if they were in themselves elastic, the same effects would follow as in the impulse of other elastic bodies; but the angle of incidence could not be equal to the angle of reflection, unless the particles of light were perfectly elastic, or the bodies on which they impinged were perfectly elastic. Now we know that the bodies on which these particles impinge are not perfectly elastic; and also that if the particles of light were perfectly elastic, direction. Actual experiments confirm the truth of this position; and to the change in the direction of a particle o light, owing to its nearness to a body, we give the name of inflection.

From one of these experiments, made by sir Isaac Newton, the whole of this subject will be easily understood. A the distance of two or three feet from the window of a darkened room, in which was a hole three-fourths of an inch broad, to admit the light, he placed a black shee of pasteboard, having in the middle a hole about a quarter of an inch square, and behind the hole the blade of a sharp knife to intercept a small part of the light which would otherwise have passed through the hole. The planes of the pasteboard and blade were parallel to each other; and when the pasteboard was removed a such a distance from the window, as tha all the light coming into the room mus pass through the hole in the pasteboard he received what came through this hol on a piece of paper two or three feet beyond the knife, and perceived two stream of faint light shooting out both ways from the beam of light into the shadow. A the brightness of the direct rays obscured the fainter light, by making a hole in hi paper he let them pass through, and had thus an opportunity of attending closely to the two streams, which were nearly equal in length, breadth, and quantity o light. That part which was nearest to the sun's direct light was pretty strong fo the space of about a quarter of an inch decreasing gradually till it became imperceptible; and at the edge of the knife i subtended an angle of about twelve, or at most, fourteen degrees.

Another knife was then placed opposit to the former, and he observed, tha when the distance of their edges wa about the four-hundredth part of an inch

om trees; by which means
ll be more vigorous and heal-
de much longer, and produce
If the ground has been pas-
ea sward should be plowed in
efore the trees are planted;
uffered to lie a summer fal-
greatly mend it, provided it is
or three times to rot the grass,
it the growing of weeds. At
s it should be plowed pretty
der to make it loose for the
trees, which if the soil is dry,
planted in October; but if it is
beginning of March will be a
n. If several sorts of fruit-trees
nted on the same spot, you
rve to plant the largest grow-
ackwards, and so proceed to
growth, continuing the same
te through the whole planta-
hich means the sun and air
asily pass through the whole
When you have planted the
should support them with
revent their being blown out
d by the wind: and the fol-
g, if the season should prove
antity of green turf, and lay it
roots, with the grass down-
which means a great expence
will be saved, and after the
hey will be out of danger.
ou plow the ground betwixt
, you must be careful not
p amongst their roots, which
ly damage the trees, but if
utiously, your stirring the face
d will be of great service to
gh you should observe, never
ear the tree, nor to suffer any
g weeds to grow about them:
s would starve them, by ex-
: goodness of the soil, which
or three years should be mend-
ng or other manure. These
they are planted out, will re-
er pruning besides cutting off
nches, or such as cross each

fool-stones, a genus of the gy-
ndria class of plants, the co-
ch is of a corniculated form;
is an oblong unilocular cap-
aining numerous scobiform

ntial character is, nect. a horn
ind the flower. There are 50
his genus, which exceedingly
he ophrys.
it flourishes in various parts of
l Asia, and grows in our coun-
eously, and in great abun-
s assiduously cultivated in the
he root of it forms a consider-
f the diet of the inhabitants of
rsia, and Syria. From it is
limentary powder called salep,
ared from foreign roots, is sold
x shillings per pound, though
furnished by ourselves at a
of that price, if we chose to pay
on to the culture of this plant.
mascula is the most valued
rpose. A dry, and not very
best adapted to its growth.
, a form of trial, for discovering innocence or guilt, formerly practised over almost all Europe, and which prevailed in England from the time of Edward the Confessor, till it was abolished by a declaration of Henry III. It was called purgatio vulgaris, or judicium, in opposition to bellum, or combat, the other form of purgation.

In England an offender, on being arraigned, and pleading Not guilty, had it in his choice to put himself upon God and his country; that is, upon the verdict of the jury; or upon God alone, on which account it was called the judgment of God, it being presumed that God would deliver the innocent. The more popular kinds of ordeal were red hot iron and water: the first for freemen and people of fashion, and the last for peasants. Fire ordeal was performed either by taking up in the hand a piece of red-hot iron, of one, two, or three pounds weight: or else by walking barefoot and blindfold over nine red hot ploughshares, laid at unequal distances; and if the party escaped unhurt he was adjudged innocent, if not, he was condemned as guilty. Water ordeal was performed either by plunging the bare arm up to the elbow in boiling water, and escaping unhurt thereby: or by casting the person suspected into a river or pond of water: if he floated therein, without any action of swimming, it was deemed an evidence of his guilt; but if he sunk he was acquitted. 4 Black. 340.

ORDER. See *Architecture.*

ORDERS, or *Ordination.* No person shall be admitted to the holy order of deacon under 23 years of age; nor to the order of priest unless he is 24 complete; and none shall be ordained without a title, that is, a nomination to some cure or benefice, and he shall have a testimonial of his good behaviour, for three years past, from three clergymen; and the bishop shall examine him, and if he sees cause may refuse him. And before he is ordained he shall take the oath of allegiance and supremacy before the ordinary, and subscribe the thirty-nine articles.

ORDINARY, in common and canon law, is one who has an ordinary or immediate jurisdiction in ecclesiastical causes in such a place.

ORDINATES, or *Ordinate applicates*, in geometry, are parallel lines terminating in a curve, and bisected by a diameter.

ORDNANCE, a general name for all sorts of great guns used in war. See *Gunnery*.

ORDNANCE, *office of*, an office kept within the Tower of London, which superintends and disposes of all the arms, instruments, and utensils of war, both by sea and land, in all the magazines, garrisons, and forts, in Great Britain.

ORES, *metallic*. Metals exist in ores in one or other of the four following states. 1. In a metallic state, and either solitary: or combined with each other. 2. Combined with sulphur. 3. In the state of oxides. 4. Combined with acids. Each order therefore may be divided into the four following genera: 1. Alloys; 2. Sulphures; 3. Oxides; 4. Salts.

It must be observed, however, that every metal has not hitherto been found in all these four states, and that some of them are hardly susceptible of them all. Some of the orders, therefore, want one or more genera, as may be seen from the following table, taken from Dr. Thomson's incomparable work on chemistry; a work of which every student of that science, or of natural philosophy, ought to be possessed.

Order I.—Gold.—1. Alloys.

Order II.—Platinum.—1. Alloys.

Order III.—Silver.—1. Alloys; 2. Sulphurets; 3. Oxides; 4. Salts.

Order IV.—Mercury.—1. Alloys; 2. Sulphurets; 3. Oxides; 4. Salts.

Order V.—Copper.—1. Alloys; 2. Sulphurets; 3. Oxides; 4. Salts.

Order VI.—Iron.—1. Alloys; 2. Sulphurets; 3. Oxides; 4. Salts.

Order VII.—Tin.—1. Sulphurets; 2. Oxides.

Order VIII.—Lead.—1. Sulphurets; 2. Oxides; 3. Salts.

Order IX.—Nickel.—1. Sulphurets; 2. Oxides.

Order X.—Zinc.—1. Sulphurets; 2. Oxides; 3. Salts.

Order XI.—Antimony.—1. Alloys; 2. Sulphurets; 3. Oxides; 4. Salts.

Order XII.—Bismuth.—1. Alloys; 2. Sulphurets; 3. Oxides.

Order XIII.—Tellurium.—1. Alloys.

Order XIV.—Arsenic.—1. Alloys; 2. Sulphurets; 3. Oxides; 4. Salts.

Order XV.—Cobalt.—1. Alloys; 2. Sulphurets; 3. Oxides; 4. Salts.

Order XVI.—Manganese.—1. Oxides; 2. Salts.

Order XVII.—Tungsten.—1. Oxides.

Order XVIII.—Molybdenum.—1. Sulphurets.

Order XIX.—Uranium.—1. Oxides.

Order XX.—Titanium.—1. Oxides.

Order XXI.—Chromium.—1. Oxides.

Order XXII.—Columbium.—1. Alloys.

Order XXIII.—Tantalium.—1. Oxides.

ORGAN, in general, is an instrument or machine, designed for the production of some certain action or operation; in which sense the mechanic powers, machines, and even the veins, arteries, nerves, muscles, and bones of the human body, may be called organs.

The organs of sense are those parts of the body by which we receive the impressions or ideas of external objects, being commonly reckoned five, viz. the eye, ear, nose, palate, and cutis.

ORGAN, a wind instrument blown by bellows, and containing numerous pipes of various kinds and dimensions, and multifarious tones and powers. Of all musical instruments this is the most proper for the sacred purpose to which it is most generally applied in all countries to wherever it has been introduced. Its structure is lofty, elegant, and majestic; and its solemnity, grandeur and rich volume of tone, have justly obtained it an acknowledged pre-eminence over every other instrument.

The church-organ consists of two parts: the main body, called the great organ, and the positive or little organ, which forms a small case or buffet, commonly placed before the great organ. The size of an organ is generally expressed by the length of its largest pipe: thus they say, an organ of 8, 16, 32 feet, &c. The organ in the cathedral church at Ulm in Germany is 93 feet high and 28 broad; its largest pipe is 13 inches diameter, and it has 16 pair of bellows.

ORIBASIA, a genus of the monogynia order, in the pentandria class of plants, and in the natural method ranking under the 47th order, stellatæ. The corolla is small, tubulated, and monopetalous. The pericarpium is a globular berry, grooved longitudinally; is quinquelocular, and contains one seed. Of this there are six species, all natives of the warmer parts of America, viz. 1. Officinalis; the natives of Guiana make infusions of the leaves, and give them in cases of spasmodic asthma. 2. Racemosa. 3. Violacea. 4. Lutea. 5. Paniculata. 6. Longiflora.

ORICHALCUM. See *Zinc.*

ORIGANUM, *origany or marjoram*, a genus of the gymnospermia order, in the didynamia class of plants, and in the natural method ranking under the 42d order, verticillatæ. There is a strobilus or cone collecting the calices together. The principal species are two hardy perennials and an annual for the open ground, and five perennials for the green house, viz. 1. The *vulgare*, or wild marjoram. 2. The heracleoticum, or winter marjoram.

ORIGENISTS, in church history, a Christian sect in the fourth century, so called from their drawing their opinions from the writings of Origen. The Origenists maintained, that the souls of men had a pre-existent state, that they were holy intelligences, and had [illegible] in heaven before the body was [illegible]; that Christ is only the son of God by adoption.

ORIGINAL, in the court of king's bench, the usual original writ issued is in actions, as for action of trespass upon the case. And this court does not [illegible] originals in actions of debt, covenant, account, &c. whereas the court of common pleas proceeds by original in all kinds of actions; but to arrest and put a party to outlawry, it is used in all cases.

ORIOLUS, *oriole*, in ornithology, a genus belonging to the order picæ. The bill in this genus is straight, conic, sharp pointed; edges cultrated, inclining inwards; mandibles of equal length. Nostrils small, placed at the base of the bill, and partly covered. Tongue bifid at the end. Toes, three forward, one backward; the middle joined near the base to the outmost one. These birds are inhabitants of America, except in a few instances; they are a noisy and gregarious, frugivorous, granivorous, and vermivorous race, very numerous, and make pensile nests. The several species, which are very numerous, since Mr. Latham describes no less then forty-five, seem to be principally distinguished by their colour.

ORION, in astronomy, a constellation of the southern hemisphere. See *Astronomy.*

ORION'S RING, in astronomy, a constellation more usually called Eridanus. See *Eridanus.*

ORNITHOGALUM, *star of Bethlehem*, a genus of the hexandria monogynia class of plants, the corolla whereof consists

ı, oblong-lanceolated figure from the
ne middle, erect from thence to
ı, plano-patent; they are per-
but lose their colour; the fruit is
angulated capsule, formed of
lves, and containing three cells;
s are numerous and roundish,
ptacle columnar.
are thirty-five species, all of
rbaceous and perennial, rising
se to six feet high, having stalks
ed with long spikes of hexapeta-
ar-shaped, white and yellow

THOLOGY, that branch of zoo-
ich treats of birds. See *Bird*. Lin-
hose ornithology we have follow-
ıges the whole class of birds un-
orders, according to the different
of their beaks, viz.
ipitres, upper mandible with an
projection. 2. Picæ, bill com-
convex; with feet formed for
g or climbing. 3. Anseres, bill
with skin, broad at the tip; some
ed some without teeth. 4. Gral-
l roundish, tongue fleshy; some
ees, some with four toes. 5.
, bill convex, upper mandible
6. Passeres, bills conic, sharp-
.

THOPUS, *bird's foot*, a genus of
lphia decandria class of plants,
pilionaceous flower: its fruit is
g jointed pod, of a cylindrical
and containing in each joint a sin-
adish seed; add to this, that se-
these pods usually grow together.
re five species.
THORYNCHUS PARADOXUS,
ew South Wales, a singular qua-
which has not yet been properly
in the Linnæan system. The
markable circumstance in this cu-
imal, is the great similarity of
with that of a duck, which, how-
still more striking in its internal
. From the external form of the
this animal, one might be more
d to conclude that it belonged to
aquatic bird, than to a creature
mammalia tribe. Both the jaws
road and low as in a duck, and
tria has no traces of a suture, as
ally the case in full grown birds.
likewise a singularity in the ca-
e scull, of which nothing like it
n in any quadruped animals of the
lia, though there exists some-
nalogous in the class of birds,
, a considerable bony falx, which
ed along the middle of the os fron-
l the ossa bregmatis. This proces-
n general scarcely to be seen in
mmalia, even in those that have
tentorium cerebelli. The mandi-
this animal is very singular, con-
of a beak, the under part of which
margin indented as in ducks, and
proper instrument for chewing that
ated behind, within the cheeks.
as no teeth, nor even the traces of
, but only two broad processes
peculiar formation on each side,
undulated superficies fit one ano-
Dr. Shaw says of the specimen he
ved, that it had no teeth, "denti-
ulla sunt vestigia." *But Sir Joseph*

Banks informs us, that Mr. Home has found in a specimen that belongs to the Society of Natural History at Newcastle, on each side of the jaws, two small and flat molar teeth. The fore part of this anomalous mandible, or the beak, is covered and bordered with a coriaceous skin, in which three parts are to be distinguished; 1. The proper integument of the beak (integumentum rostri). 2. The labiated margins of it (margines labiales.) 3. A curious edge of the skin of the beak (limbus transversarius).

OROBANCHE, *broom-rape*, a genus of the didynamia angiospermia class of plants, ranking under the 40th order, personatæ. The corolla is monopetalous and ringent; and its fruit an oblong capsule formed of two valves, and containing a great many minute seeds; the calyx is bifid. There is a glandule under the base of the germen. There are fourteen species.

OROBUS, *bitter vetch*; a genus of the decandria order, in the diadelphia class of plants; and in the natural method ranking under the 32d order, papilionaceæ. The style is linear; the calyx obtuse at the base, with the upper segments deeper and shorter than the rest. There are 16 species. All of them have fibrated roots, which are perennial, but are annual in stalk, rising early in spring and decaying in autumn. They are very hardy plants, and prosper in any common soil of a garden. Most of the sorts are very floriferous, and the flowers conspicuous and ornamental for adorning the flower-compartments.

ORONTIUM, a genus of the monogynia order, in the hexandria class of plants; and in the natural method ranking under the second order, piperitæ. The spadix is cylindrical, covered with florets: the corolla hexapetalous and naked; there is no style: the follicles are monospermous. There are two species, marsh plants of Canada and Japan.

ORPHAN: in the city of London there is a court of record established for the care and government of orphans.

ORPIMENT. See *Arsenic*.

ORRERY, a curious machine for representing the motions and appearances of the heavenly bodies. We shall in this place merely shew the theory of the wheels, leaving a more particular description for the article *Planetarium*. We must first compare and find out the proportion which the periodical times, or revolutions, of the primary planets, bear to that of the earth; and they are such as are expressed in the table below: where the first column is the time of the earth's period in days and decimal parts: the second, that of the planets; the third and fourth are numbers in the same proportion to each other: as

365,25 : 88 ☿ :: 83 : 20, for Merc.
365,25 : 224,7 ♀ :: 52 : 32, for Venus.
365,25 : 686,9 ♂ :: 40 : 75, for Mars.
365,25 : 4332,5 ♃ :: 7 : 83, for Jupiter.
365,25 : 10759,3 ♄ :: 5 : 148, for Saturn.

If we now suppose a spindle or arbor

with six wheels fixed upon it in an horizontal position, having the number of teeth in each corresponding to the numbers in the third column, viz. the wheel AM (fig. 1.) of 83 teeth, BL of 52, CK of 50 (for the earth), DI of 40, EH of 7, and FG of 5; and another set of wheels moving freely about an arbor, having the number of teeth in the fourth column, viz. AN of 20, BO of 32, CP of 50 (for the earth), DQ of 75, ER of 83, and FS of 148; then, if those two arbors of fixed and moveable wheels are made of the size, and fixed at the distance from each other as here represented in the scheme, the teeth of the former will take those of the latter, and turn them very freely, when the machine is in motion.

These arbors, with their wheels, are to be placed in a box of an adequate size, in a perpendicular position: the arbor of fixed wheels to move in pivots at the top and bottom of the box; and the arbor of moveable wheels to move in pivots at the top and bottom of the box; and the arbor of moveable wheels to go through the top of the box, on a proper height, on the top of which is to be placed a round ball, gilt with gold, to represent the sun. On each of the moveable wheels is to be fixed a socket, or tube, ascending above the top of the box, and having on the top a wire fixed, and beat at a proper distance into a right angle upwards, bearing on the top a small round ball, representing its proper planet.

If then on the lower part of the arbor of fixed wheels is placed a pinion of screw-teeth, a winch turning a spindle with an endless screw, playing in the teeth of the arbor, will turn it with all its wheels; and these wheels will move the others about with their planets, in their proper and respective periods of time, very exactly. For, while the fixed wheel CK moves its equal CP once round, the wheel AM will move AN a little more than four times round, and so will nicely exhibit the motion of Mercury; and the wheel FG will turn the wheel FS about $\frac{1}{29{,}5}$ round, and so will truly represent the motion of Saturn, and the same is to be observed of all the rest.

ORTEGIA, a genus of the class and order triandria monogynia. The calyx is five-leaved; corolla none; capsule one-celled; seeds many. There are two species, trailing plants of Spain and Italy.

ORTHOGRAPHY, that part of grammar which teaches the nature and affections of letters, and the just method of spelling or writing.

ORTHOGRAPHY, in geometry, the art of drawing or delineating the fore-right plan of any object, and of expressing the heights or elevations of each part. It is called orthography, from its determining things by perpendicular lines falling on the geometrical plane.

ORTHOGRAPHY, in architecture, the elevation of a building.

ORTHOGRAPHY. See *Perspective.*

ORTOLAN. See Emberiza.

ORYZA, *rice*, a genus of the digynia order, in the hexandria class of plants; and in the natural method ranking under the 4th order, gramina. The calyx is a bivalved uniflorous glume; the corolla bivalved, nearly equal, and adhering to the seed. There is but one species, namely, the sativa or common rice. This plant is greatly cultivated in most of the Eastern countries, where it is the chief support of the inhabitants; and great quantities of it are brought into England, and other European countries every year, where it is much esteemed for puddings, &c. it being too tender to be produced in these northern countries without the assistance of artificial heat; but from some seeds which were formerly sent to Carolina there have been great quantities produced, and it is found to succeed there as well as in the Eastern countries.

OSBECKIA, a genus of the octandria monogynia class and order. The cal. is four-cleft; cor. four and five-petalled; stam. eight or ten; anthers beaked; caps. inferior, four-celled. There is one species, a trifling plant of China.

OSCILLATION, in mechanics, the vibration, or reciprocal ascent and descent, of a pendulum. See *Pendulum.*

It is demonstrated, that the time of a complete oscillation in a cycloid, is to the time in which a body would fall through the axis of that cycloid, as the circumference of a circle to its diameter; whence it follows, 1. That the oscillations in the cycloid are all performed in equal times, as being all in the same ratio to the time in which a body falls through the diameter of the generating circle. 2. As the middle part of the cycloid may be conceived to coincide with the generating circle, the time in a small arch of this circle will be nearly equal to the time in the cycloid; and hence the reason is evident, why the times in very small arches are equal. 3. The time of a complete oscillation in any little arch of a circle, is to the time in which a body would *fall* through half the radius, as the circumference of a circle, to its diameter; and since the latter time is half the time in which a body would fall through the whole diameter, or any chord, it follows that the time of an oscillation in any little arch, is to the time in which a body would fall through its chord, as the semicircle to the diameter. 4. The times of the oscillations in the cycloids, or in small arches of circles, are in a sub-duplicate ratio of the lengths of the pendulums. 5. But if the bodies that oscillate *are acted on by* unequal accelerating *forces*, then the oscillation will be performed in times that are to one another in the ratio compounded of the direct subduplicate ratio of the lengths of the pendulums, and inverse subduplicate ratio of the accelerating forces. Hence it appears that if oscillations of unequal pendulums are performed in the same time, the accelerating gravities of these pendulums must be as their lengths; and thus we *conclude*, that the force of gravity decreases as you go towards the equator, since we find that the lengths of pendulums that vibrate seconds are always less at a less distance from the equator. 6. The space described by a falling body in any given time, may be exactly known; for finding by experiments, what pendulum [illegible]

the half of the pendulum will be to
ser required, in the duplicate ratio
diameter of a circle to the circum-
ke.

re of OSCILLATION. See *Centre*.

ITES, a genus of the class and order
esia polygamia frustranea. The
s imbricate, scariose; cor. of the
igulate: down obsolete; recept.
. There are four species, shrubs of
pe.

UNDA, *moon-wort*; a genus of the
of filices, in the cryptogamia class
nts. There are twenty-seven spe-
the most remarkable of which is
galis, osmund royal, or flowering
This is a native of Britain, growing
trid marshes. Its leaf is doubly
d, bearing bunches of flowers at
nds. The root boiled in water is
lumy, and is used in the north to
linen instead of starch. Some of the
only bear flowers.

IFICATION, the formation of
. See *Concretions*.

EOLOGY. See *Anatomy*.

EOSPERMUM, a genus of the class
rder syngenesia polygamia necessa-
The cal. is simple, in two rows, ma-
ived, almost equal; seeds globular,
red, bony; down none; recept.
. There are 17 species, shrubs of
ope.

RACION, in ichthyology, a genus
branchiostegous order of fishes, of a
se, oval, or ovato-quadrangular
e; the skin is always very firm and
and is in some species smooth, in
s entirely covered with spines; and,
y, in some the spines entirely occupy
particular places; there are no bel-
s, and the others are five in number,
two pectoral or lateral fins, one on
ack, the pinna ani, and the tail.
are 12 species of this genus: the
ster has a triangular body unarmed;
its India; the back appearing as if
ed with rhombic marks cut trans-
ly. The quadricornus, with frontal
ubcaudal spines, inhabits India and
ea.

TRACION, trunk-fish, a genus of
s, of the order nantes; the generic
cter is, teeth pointing forwards, cy-
ic, rather blunt; body mailed by a
covering.

STREA, the *oyster*, in zoology, a ge-
belonging to the order of vermes
cea. The shell has two unequal
s; the cardo has no teeth, but a
hollowed one with transverse late-
reaks. There are thirty-one species,
cipally distinguished by peculiarities
heir shells. The common oyster is
oned an excellent food; and is eaten
raw and variously prepared. The
racter of the genus, in the words of
us, is, "The animal a tethys; the
bivalve, unequivalve, with some-
s like ears; the hinge void of teeth,
a deep oval hole, and transverse
ks on the sides. There is no womb
nus." The genus is divided into four
ies, of which ostrea is the last.

e oyster differs from the muscle in
utterly unable to change its situation.
entirely without a tongue, which an-
s the purposes of an arm in the other animal, but nevertheless is often attached very firmly to any object it happens to approach.

Oysters usually cast their spawn in May, which at first appears like drops of candle-grease, and sticks to any hard substance it falls upon. These are covered with a shell in two or three days; and in three years the animal is large enough to be brought to market. As they invariably remain in the places where they are laid, and as they grow without any other seeming food than the afflux of sea-water, it is the custom at Colchester, and other parts of England, where the tide settles in marshes on land, to pick up great quantities of small oysters along the shore, which, when first gathered, seldom exceed the size of sixpence. These are deposited in beds where the tide comes in, and in two or three years grow to a tolerable size. They are said to be better tasted for being thus sheltered from the agitations of the deep; and a mixture of fresh water entering into these repositories, is said to improve their flavour, and increase their growth and fatness.

The oysters, however, which are prepared in this manner, are by no means so large as those found sticking to rocks at the bottom of the sea, usually called rock-oysters. These are sometimes found as broad as a plate, and are admired by some as excellent food. But what is the size of these compared to the oysters of the East Indies, some of whose shells have been seen two feet over? The oysters found along the coast of of Coromandel, are capable of furnishing a plentiful meal for eight or ten men; but it seems universally agreed that they are no way comparable to ours for delicacy of flavour.

OSTRICH. See *Struthio*.

OSYRIS, *poet's rosemary*, a genus of the diœcia triandria class of plants, without any flower-petals; the fruit is a globose unilocular berry, containing a single osseous seed. There are two species. This whole shrub is astringent, and consequently good in fluxes.

OTHERA, a genus of the tetrandria monogynia class and order. The cal. is four-paried; pet. four; stigma sessile; caps. There is one species, a shrub of Japan.

OTHONNA, a genus of the polygamia necessaria order, in the syngenesia class of plants; and in the natural method ranking under the 49th order, compositæ. The receptacle is naked; there is almost no pappus; the calyx is monophyllous, multifid, and nearly cylindrical. There are 27 species.

OTIS, the *bustard*, in ornithology, a distinct genus of birds, of the order of the gallinæ, the characters of which are these: there are three toes on each foot, all turned forwards; and the head is naked, or has no comb. There are four species, principally distinguished by their colour.

OTTER. See *Mustela*.

OVAL, an oblong curvilinear figure, otherwise called ellipsis. The proper oval, however, or egg-shape, differs considerably from that of the ellipsis, being an irregular figure, narrower at one end than at the other; whereas the ellipsis, or mathematical oval, is equally broad at

overseers of the poo
each parish, must be duly appo
and sworn before two justices of the
one whereof must be of the quorum.
The overseers thus appointed
taking on them the office, shall
fourteen days, receive the boo
assessments, and of accounts, from
predecessors, and what money an
terials shall be in their hands, and
burse them for their arrears. 17 Geo.
38. And shall take order from time t
with the consent of two such justi
aforesaid, for setting to work the
dren of such parents who shall n
the said overseers be thought ab
keep or maintain them, and usin
ordinary or daily trade of life to get
living by. 43 Eliz. c. 2.

OVERT ACT. In the case of tre
in compassing or imagining the dea
the King, this imagining must be m
fested by some open act; otherwise b
only an act of the mind, it cannot
under any judicial cognizance.
words are held not to amount t
overt act, unless put into writing
which case they are then held to be
overt act, as arguing a more delibe
intention. No evidence shall be admi
of any overt act, that is not expressly
in the indictment. 7 W. c. 3.

OVIEDA, a genus of the didynamia
spermia class and order. The cal. is f
cleft; cor. tube subcylindric, super
very long, berry globular. There are
species, shrubs of South America.

OVIS, *sheep*, a genus of quadrup
of the order pecora; the generic c
racter is, horns hollow, wrinkled, tu
ing backwards, and spirally intorte
front-teeth, eight in the lower ja
canine-teeth, none.

OUNCE, a little weight, the sixteen
part of a pound avoirdupois, and t
twelfth part of a pound troy; the oun
avoirdupois is divided into eight dra

without alteration. That part
which sublimes is unaltered.
acid is distilled a second time
a white smoke, which, con-
the receiver, produces a co-
chrystallizable acid, and a dark
matter remains behind. Dur-
distillation, a vast quantity of
our makes its escape. From
of oxalic acid, Bergman ob-
cubic inches of gas, half of
carbonic acid, and half car-
hydrogen. Fontana, from an
, obtained 430 cubic inches of
hird of which was carbonic
st carbureted hydrogen. From
, it is evident, that oxalic acid
ed of oxygen, hydrogen and

stals of oxalic acid are soluble
'n weight of boiling water. Wa-
temperature of 65.7 deg. dis-
its weight of them. The speci-
of the solution is 1.0593. One
arts of boiling alcohol dissolve
of these chrystals; but at a
perature only 40 parts. Liquid
has a very acrid taste when
ntrated, but a very agreeable
when sufficiently diluted with

es all vegetable blues, except
a red. One grain of chrystalli-
dissolved in 1920 grains of wa-
ns the blue paper in which su-
are wrapt: one grain of it,
n 3600 grains of water, reddens
ned with turnsole. According
u, one part of the chrystalline
fficient to communicate a sen-
ty to 2633 parts of water.
is such, that none of it is
when water containing it in so-
ised to the boiling temperature.
cid is not affected by exposure
or to the action of oxygen gas.
of the simple combustibles on
een tried.
pable of oxidizing lead, copper,
bismuth, nickel, cobalt, zinc,
anese.
not act upon gold, silver, platina,
ry.
acid combines with alkalies,
nd metallic oxides; and forms
n by the name of oxalats.
c and acetic acids dissolve oxa-
at without altering it. Sulphu-
ecomposes it partly by the as-
heat, and a quantity of char-
med. Nitric acid decomposes it
g heat, and converts it into wa-
rbonic acid. From this result,
the products obtained by dis-
re oxalic acid, it follows, that
s composed of oxygen, hydro-
carbon. Fourcroy informs us,
uelin and he have ascertained
omposed of 77 oxygen, 13 carbon,
en.
experiments upon which this
ounded, have not been pub-
that it is impossible to judge of
racy.
nities of oxalic acid, according to
are as follows: lime, barytes,
magnesia, potass, soda, ammo-
ina.

OXALIS, *wood-sorrel*, a genus of the pentagynia order, in the decandria class of plants, and in the natural method, ranking under the 15th order gruinales. The calyx is pentaphyllous the petals connected at the heels, the capsule pentagonal, and opening at the angles. There are 96 species.

OXIDE, any substance combined with oxygen, in a proportion not sufficient to produce acidity.

Oxygen is capable of combining with bodies usually in various proportions, constituting a variety of compounds with almost every substance with which it is capable of uniting. Now the whole of the compounds into which oxygen enters, may be divided into two sets: 1. Those which possess the properties of acids; and, 2. Those which are destitute of these properties. The first set of compounds are distinguished by the term acids; to the second, the term oxide has been appropriated. By oxide, then, is meant a substance composed of oxygen and some other body, and destitute of the properties which belong to acids. It is by no means uncommon to find a compound of the same base and oxygen belonging to both of these sets, according to the proportion of oxygen which enters into the compound. In all these cases, the smaller proportion of oxygen constitutes the oxide; the larger the acid. Hence it follows, that oxides always contain less oxygen than acids with the same base.

Oxygen combines with three distinct sets of bodies, the simple combustibles, the incombustibles, and the metals, and forms oxides with every individual belonging to these sets. These oxides vary as the substance which constitutes the base; but all the oxides of the simple combustibles are combustible, except the oxide of hydrogen, which is a product of combustion; all the oxides of the simple incombustibles are supporters of combustion; and all the oxides of the metals are either products of combustion or supporters. Of course, the first set of oxides (except that of hydrogen) cannot be formed by combustion; neither can the second set; but part of the third set are formed by combustion, a part by the union of the oxygen of supporters without combustion.

Besides these oxides, which may be considered as simple, because they contain but one ingredient combined with oxygen, there is another set much more numerous than they, consisting of oxygen united at once with two or more simple substances. These bodies may be distinguished from the others by giving them the name of compound oxides.

Oxides are often distinguished according to the degree of oxygen they contain. Thus the protoxide or first oxide denotes a metal combined with the least portion of oxygen; deutoxide, or second oxide, a metal combined with two doses of oxygen; and when a metal has combined with as much oxygen as possible, the compound is called a peroxide.

OXIDE, *carbonic*. When a mixture of purified charcoal and oxide of iron or zinc is exposed to a strong heat in an iron retort, the metallic oxide is gradually reduced, and during the reduction a great quantity of gas is evolved. This gas is a mixture of carbonic acid gas, and another which burns with a blue flame. This last is carbonic oxide.

OXYRAPHUS, a genus of plants as yet unclassed, nearly allied to the mirabilis, a native of Peru.

OXYGEN, in chemistry, a simple substance that enters into the composition of water and air. The term oxygen signifies that which generates or produces acids. This, one of the most characteristic properties of this body, was discovered by Dr. Priestley in 1774. It was at first called dephlogisticated air, and afterwards successively known by the names of eminently-respirable air, pure air, vital air, as long as it was not known that this aerial form is merely one of its states of combination; which, notwithstanding its frequency, and its being less impure in this than in any other condition, does not prevent its being concealed in other states; and more particularly as, by combining with many bodies, it loses this elastic state or appearance of air. As soon as this truth was well proved, and clearly explained by Lavoisier, the necessity was admitted of giving it a different name, which might be applicable to all the states in which it could exist, as well that of gas as of the liquid or solid form. Lavoisier first called it the oxygenous principle; and the French school having decided for the word oxygen, by admitting a simple change of the termination in the first word proposed by Lavoisier, this name became generally adopted.

The effect of oxygen is of such importance, that its presence must be stated as the most indispensable condition of combustion; which would not otherwise take place. It truly constitutes the essential part of that process, because its most decided and extensive character is its indispensability in that process.

Oxygen, like many other natural bodies, is found in three states, but in neither of them is it alone or insulated. In the gaseous form it is dissolved in caloric; in the liquid and solid form it is combined with different substances, and can never exist concrete and pure without combination, like many other substances no less decomposable than itself. And though we can, in imagination, conceive it alone, insulated, pure, and in a solid state, experiment has never yet exhibited this fact. It is a discovery which still remains concealed in the bosom of nature; or may exist, ill understood, under the name of some substance yet unknown in our collections of minerals.

As oxygen is frequently contained in a more or less solid form in several natural fossils which have undergone combustion, and as it has much attraction for caloric, it is only required that some one of these fossils should be heated more or less, or penetrated with a great quantity of caloric, in order to disengage this principle and obtain it in the form of air or gas. This is done by chemists to procure oxygen gas. They expose certain substances, particularly metals formed by nature or by art, to a fire of considerable activity in closed vessels, so disposed as to conduct and receive, under inverted jars, the elastic fluid intended to be collected. The burned matter passes again into a combustible state; and the oxygen which gave it the burned state, being separated and fixed by caloric, for which it has a great attraction, becomes developed in the form of gas. It is the product of a true combustion.

OXYGEN GAS. See *Air*.

OXYMEL, in pharmacy, a composition of vinegar and honey.

OXYMURIATIC ACID. This acid was discovered by Scheele in 1774, during his experiments on manganese. He gave it the name of dephlogisticated muriatic acid, from the supposition that it is muriatic acid deprived of phlogiston. The French chemists, after its composition had been ascertained, called it oxygenated muriatic acid; which unwieldy appellation Kirwan has happily contracted into oxymuriatic acid.

It may be procured by the following process: Put into a tubulated retort a mixture of three parts of common salt, and one part of the black oxide of manganese in powder. Place the retort in the sand-bath of a furnace, plunge its beak into a small water trough, and lute a bent funnel into its mouth. When the mixture has acquired a moderate heat, pour into it at intervals through the bent funnel two parts of sulphuric acid, which ought to be somewhat diluted with water. An effervescence ensues; a yellow-coloured gas issues from the retort, which may be received in large phials fitted with ground stoppers.

Oxymuriatic acid gas is of a yellowish green colour. Its odour is intolerably acrid and suffocating. It cannot be breathed without proving fatal. The death of the ingenious and industrious Pelletier, whose chemical labours have been so useful to the world, was occasioned by his attempting to respire it. A consumption was the consequence of this attempt, which, in a short time, proved fatal. When atmospheric air, containing a mixture of it, is breathed, it occasions a violent and almost convulsive cough, attended with much pain in the chest. This cough usually continues to return at intervals for a day or two, and is accompanied with a copious expectoration.

It is capable of supporting combustion; in many cases even more capable than common air. When a burning taper is plunged into it, the flame is diminished, and acquires a very red colour; a great quantity of smoke is emitted, and at the same time the taper consumes much more rapidly than in common air. The facility with which bodies take fire in this gas, seems to depend on the ease with which it parts with its oxygen.

This gas is neither altered by exposure to light nor to caloric. It passes unaltered through red-hot porcelain tubes.

It does not unite readily with water. Scheele found, that after standing 12 hours over water, four-fifths of the gas were absorbed: the remainder was common air, which no doubt had been contained in the vessel before the operation.

It renders vegetable colours white, and not red, as other acids do; and the colour

destroyed can neither be restored by
nor alkalies. It has the same effects
llow wax. If the quantity of vege-
colours to which it is applied is suf-
ntly great, it is found reduced to
state of common muriatic acid.
e it is evident, that it destroys these
rs by communicating oxygen. This
erty has rendered oxymuriatic
a very important article in bleach-

en a mixture of oxymuriatic acid
nd hydrogen gas is made to pass
gh a red-hot porcelain tube, a vio-
detonation takes place. By elec-
a feeble explosion is produced.
en melted sulphur is plunged into
lammation also takes place, and the
ur is converted into sulphuric acid;
old sulphur, though it is partly acid-
by this gas, does not take fire in it.
en phosphorus is plunged into this
t immediately takes fire, burns with
derable splendour, and is converted
hosphoric acid.
muriatic acid oxidizes all the me-
ithout the assistance of heat. Seve-
them take fire as soon as they come
tact with the gas. All that is neces-
, to throw a quantity of the metal re-
to a fine powder into a vessel filled
he gas. The inflammation takes
immediately; the metal is oxidized;
he acid, decomposed and reduced
mon muriatic acid, combines with
ide, and forms a muriat. Arsenic
s in oxymuriatic acid gas with a blue
een flame; bismuth, with a lively
flame; nickel, with a white flame,
ing on yellow; cobalt, with a white
approaching to blue; zinc, with a
white flame; tin, with a feeble blu-
me; lead, with a sparkling white
copper and iron, with a red flame.
l of the metallic sulphurets, as cin-
, realgar, sulphuret of antimony,
re when thrown in powder into this

n oxymuriatic acid gas and ammo-
gas are mixed together, a rapid
stion attended with a white flame,
tly takes place; both the gases are
posed, water is formed, while azotic gas and muriatic acid are evolved. The same phenomena are apparent, though in a smaller degree, when liquid ammonia is poured into the acid gas. The same decomposition takes place, though both the acid and alkali are in a liquid state. If four-fifths of a glass tube are filled with oxymuriatic acid, and the remaining fifth with ammonia, and the tube is then inverted over water, an effervescence ensues, and azotic gas is extricated. It was by a similar experiment that Berthollet demonstrated the composition of ammonia.

Oxymuriatic acid is composed of 84 muriatic acid, and 16 oxygen.

OYER *of deed*, is when a man brings an action upon a deed, bond, &c. and the defendant appears and prays that he may hear the bond, &c. wherewith he is charged, and the same shall be allowed him; and he is not bound to plead till he has it, paying for the copy of it.

The time allowed for the plaintiff to give oyer of a deed, &c. to the defendant, is two days exclusive after it is demanded. Carth. 454. 2 Durnf. and East. 40.

OYER *and terminer*, is a court held by virtue of the king's commission to hear and determine all treasons, felonies, and misdemeanors. This commission is usually directed to two of the judges of the circuit, and several gentlemen of the county; but the judges only are of the quorum, so that the rest cannot act without them. 4 Black. 269. See *Assizes*

OYES, or *Oyez*, signifies hear ye; and is frequently used by the cryers in our courts on making proclamation, or to enjoin silence.

OYSTER. See *Ostrea*.

OZÆNA, a malignant ulcer of the nose, frequently accompanied with a caries of all the bones of that part. See *Surgery*.

OZOPHYLLUM, a genus of the class and order monadelphia pentandria. It is one-styled; calyx five toothed; petals five, long; filaments sheathing; the style five-toothed at top; teeth antheriferous; stigma one; capsules five celled. There is one species, a native of Guiana.

P

e fifteenth letter of the alphabet, as
n abbreviature, stands for Publius,
, &c.; PA. DIG. for patricia digni
. C. for patres conscripti; P. F. for
filius; P. P. for propositum, or pro-
m publice: P. R. for populus Ro-
s: PR.S for prætoris sententia, and
. for præses provinciæ. In the Ita-
usic, P, stands for piano, or softly;
r più piano: *i. e.* more softly; and
or pianissimo. or very softly. Among
omers, P.M. is used to denote post
iem, or afternoon; and sometimes
st mane, i.e. after midnight. As a nu-
, P, signifies the same as G, viz. 400; and with a dash over it thus, $\overline{G}$, 400,000. Among physicians, P. denotes pugil, or the eighth part of a handful; P. Æ. partes æquales, or equal parts of the ingredients.

PACE, *passus*, a measure taken from the space between the two feet of a man in walking; usually reckoned two feet and a half, and in some men a yard or three feet.

The geometrical pace is five feet; and 60,000 such paces make one degree of the equator.

PACK, in commerce, denotes a quan-

order, in the pentandria class of pl
and in the natural method ranking u
the 30th order, contortæ. The berr
empty, brittle, and dispermous, the
bifid. There are three species.

PÆONIA, *peony*, a genus of the dig
order, in the polyandria class of pla
and in the natural method ranking u
the 26th order, multisiliquæ. The c
is pentaphyllous; the petals five; tl
are no styles; the capsules are p
spermous. There are five species r
of them hardy. They are large he
ceous flowery perennials, with tu
rous roots, sending up strong an
stalks from one to three feet in he
terminated by very large flowers
beautiful red colour, and much la
than any rose. The common officina
male peony, is also remarkable for
capsules turning backward, opening
displaying their red inside, together
the numerous seeds in a singularly ag
able order, appearing very ornamel
after the flower is past.

PAGE, a youth of state retained in
family of a prince or great personage.
an honourable servant, to attend in v
of ceremony, carry messages, bear
trains, robes, &c. and at the same ti
to have a genteel education, and le
his exercises.

PAGOD, or *Pagoda*, a name where
the East Indians call the temple, in wh
they worship their gods. The pa
usually consists of three parts, the f
is a vaulted roof, supported on sto
or marble columns: it is adorned w
images; and, being open, all perso
without distinction are allowed to en
it. The second part is filled with g
tesque and monstrous figures, and
person is allowed to enter it but t
bramins themselves. The third is
kind of chancel, in which the statue
the deity is placed. It is shut up with

ame time, in proportion to the force of he light, and according to the nature of he colour. This participation of reflection in light and colour, constitutes hat union of colouring which it is the usiness of the painter to imitate.

Variety of tints, very nearly of the same one, employed in the same figure, and ften upon the same part, with modera-ion, contribute much to harmony.

Any loading or overcharging of colou-ng, for whatever purpose it is used, must e so discreetly managed, as not to destroy the character of the object.

The repetition of the same colour in a icture is to be avoided, unless where it erves to connect the various masses of a omposition.

The apparent value of colours in a pic-ure (as in all things) arises from com-arison.

Several colours which, placed unmix-d by one another, have a kind of aerial rightness, when mixed together produce a disagreeable earthy colour: for nstance, ultramarine with fine yellow, r fine vermilion.

Colours which by mixture lose strength nd become harmonious, are called bro-en colours, and contribute as greatly o the sweetness and softness of tones in ictures as they subtract from their rightness.

Chiaro-scuro.—The art of chiaro-scuro onsists, 1st, in connecting and combining he figures or objects of a composition n such masses of light and of shade, s are both the most pleasing to the eye nd the best calculated for the just evelopement and display of the subject. dly. In assigning to each object the colour most corresponding (on account of he force or qualities above mentioned) o its respective place in the general ass or group, and at the same time est harmonizing with the other colours f the picture, either by its natural and roper tone, or by the reflected hues hich it receives from adjoining or sur-ounding objects. The beauty of these re-exes depends on the skilful adaptation of ransparent or opaque colours. 3dly, In he judicious introduction of such acci-ents as contribute to strengthen the eneral effect and character of the work. is on chiaro-scuro, says Mengs, that de-ends the expression of the character of a icture, whether it is gay or gloomy, heerful or solemn.

The distribution of objects forms the asses of chiaro-scuro, by combining or onnecting their lights and shades in ich a manner as to prevent the eye om wandering confusedly over the ork.

The distribution of colours has an evi-ent power of uniting the masses of light d shade; as the painter may, for in-nce, introduce a figure clothed in dark-own drapery, so nearly approaching in lour to the shade of any two objects tween which it is placed, that they ill appear but one mass, and will be mbraced by the eye as such. The same fect will be produced by the apposition similar or accordant colours in various jects.

The distribution of accidents, by which accessary lights or shades are introduced, has the same obvious tendency to unite the masses of visible colour. Torches, clouds, &c. are comprised under this head.

Composition. Composition may be divided into the general distribution of objects, the grouping, the choice of attitudes, the contrast, the cast of draperies, and the management of the back ground, or the connection of the whole effect.

In composition, as far as regards the general distribution of objects, the painter ought to contrive that the spectator may, at the first sight, be struck with the general character of the subject, or at least may comprehend its principal scope. This effect is most readily produced by placing the most essential figures in the most conspicuous places, provided it can be done without violence or impropriety. Besides this distinctness in the general expression of the subject, the beauty of the composition will depend on the variety, connection, and contrast, displayed in the distribution of objects; provided, in like manner, that these are conformable to the nature of the subject, whether gay, familiar, full of motion and hurry, or still, solemn, and melancholy.

The grouping regards both design and chiaro-scuro. In the former, it respects the figures principally concerned in the expression of the subject, which must necessarily be near to, or distant from, one another, as their actions, conversations, or other mutual relations, require. In the latter, it regards those masses which are formed from objects which may be properly arranged together, and those effects of light and shade which are formed in consequence of such assemblage or union. These are the points to which the attention must be principally and diligently directed in forming the groups of a composition.

The choice of attitudes is the principal subordinate division of grouping. Whatever attitude is given, it must not only contribute its due portion to the completion of the group, but the greatest care must be taken by the painter, that it does not appear to be introduced for that purpose merely. It must be appropriate to the character of the individual figure, and expressive of its requisite action: and it must, at the same time, combine whatever beauty of form can be shewn by such a selection of turns or views of the body, as the necessary circumstances will admit. The knowledge of generic characters, under the various modifications of sex, age, and condition; of the various operations of the passions in the human mind; and a thorough acquaintance with the circumstances of the history or other subjects to be represented; are the best guides to a good choice of attitudes.

The management of the back-ground, or connection of the general effect, is effected by a due combination of lights and shades, by an union of colours, and by such oppositions or contrasts as are sufficient to relieve the distinct groups, and to give repose to the eye.

Invention, comprises every kind of subject which can be represented to sight; but it is generally divided into historical, allegorical, and mystical.

Invention simply historical, is the selection of such objects as plainly relate to or represent a subject. It extends also to the introduction of all such embellishments as are consistent and congenial with the history represented, in the same manner as in poetry.

Allegorical invention is a choice of objects which serve to represent either wholly or partly what they are not; and of which the expression arises from illusion.

Other works are partly allegorical and partly historical; in which the spectator easily distinguishes the figures purely historical from others mixed with them in the same picture, and entirely allegorical. Such are the well-known pictures of the history of Mary de Medici, painted by Rubens.

The first great requisite of allegorical painting is, that it be intelligible. An allegory not understood, is a loss of labour both to painter and spectator. For this purpose it must, in general, consist of such symbols as are established on good authority, or, if new, are obvious to the mind.

In addition to this first requisite, the proper choice of allegory, demands either that the subject could in no other way be represented, or that it could not be represented by historical invention in an equal degree of force and beauty.

Mystical invention respects the expression of such ideas as are inculcated in our minds by the precepts of religion. The Transfiguration of our Saviour, by Raffaelle, the Annunciation, Holy Families, &c. of numerous painters, are of the same kind.

Beyond the complete possession of the various component parts of art which have been enumerated, expression, in all its distinct powers of vivacity, justness, and delicacy, calls for every exertion of talent. And to all this, in order to attain perfection, must be superadded the rare and transcendant charm of grace, that indefinable excellence which no painters are allowed to have reached, except Apellas, Raffaelle, and Correggio.

Of the different classes of painting.

Painting is chiefly divided into historical (comprehending allegorical and mystical), grotesque, portrait, fancy, animals, fruits and flowers, battles, landscape, sea-views, architecture, still life. The subordinate divisions of all these are endless.

The first has been sufficiently spoken of under the head of *invention*, in the present article.

Grotesque paintings are to be found in the celebrated Loggia of the Vatican palace at Rome, painted from the designs of Raffaelle, and in the ceiling of the portico of the Capitol, carved from those of Michael Angelo.

Of portrait, as being a branch of painting to which our country is peculiarly addicted, it is requisite to give a more detailed account.

Portraiture. The greatest perfection of a portrait is extreme likeness, and the greatest fault is the resemblance of a person for whom it was not designed, unless we are inclined to except a still more grievous defect, viz. the want of resemblance to any person whatever.

Various difficulties attend, and yet seldom impede, the execution of this task. It is true that there is not a single person in the world, of whatever age, sex, or condition, who has not a peculiar character both in body and face; but it is also the essential duty of portraiture, that it not only imitate what we see in nature, but that it exhibits such views of nature as are confessedly the most advantageous to the person represented. The moment that the idea raised by the sight of the portrait is inferior to that raised by the sight of the person, the labour of the artist sinks into the debasing region of caricature.

Likeness, however, being the essence of portrait, it is unquestionably the part of the painter to imitate defects as well as beauties, since, by this means, the resemblance will be the more complete. He is only to be aware that he strictly preserves that balance which constitutes the character of the object. It has been sometimes suggested by those who are more willing to court favour than fame, that appearances of deformity, when the air, temper, and general likeness of the subject, can be discerned without them, ought to be omitted or corrected in portraiture; but this must be done at least with considerable discretion: for, by too strenuous endeavours to correct nature, it is always found that the painter insensibly falls into a habit of giving a general air to his portraits, as suitable to one person as to another, or perhaps properly suited to none.

The resemblance, as well as every other excellence, of a portrait, depends on feature, expression, air, colouring, attitude, and attire.

The features require to be carefully examined and studied by inspection in many different views, so that at the moment when the painter puts his pencil to the canvas, he may be possessed not only of the apparent form of each particular feature in the view in which he represents it, but of its real and characteristic [illegible] also, the full expression of which is not discernible in every view. Each particular feature should appear so distinctly shaped, as that an exact model of the real head could be formed from the picture, if requisite: and they must be at the same time so blended in the general mass of the face, that no one shall obtrude itself on the eye beyond the rest. The peculiar mode of touch, or execution, whereby each feature is best distinguished, can only be learned from practice, and the attentive study of the best masters.

With respect to expression, it is requisite to observe, that the greatest care is to be used in a portrait, in order that the expression of the features may be uniform and consistent with each other. From

n this respect are among the most fre-
uent in portrait-painting. The mouth
s sometimes represented smiling, while
e eyes are sad, and vice versa, &c.
he painter must therefore constantly
ear in mind the general idea that he
as formed of the countenance he intends
o express, and must be watchful of the
orresponding forms of the features in
oments of similar expression. See *Ex-
ression*.

The air principally regards the lines
f the face or figure, the attire of the
ead or person, and the stature or make
f the general form.

The proper lines of the face or figure
epend on accuracy of drawing, and an
ntire agreement of the parts of the
ame form with one another. Nothing
o entirely disguises or alters the appear-
nce of an individual person as the change
f head-dress, whether it is the adjust-
ent of hair or attire. The greatest at-
ention, therefore, is to be used in adapt-
g the arrangement of this part of the
ortrait to the general character of the
erson represented.

The stature and make, in the same
anner, contribute to the force of resem-
ance (as the least observation on na-
e will teach us), and never fail con-
derably to influence the air of the per-
n.

With regard to the methods of pro-
ding in the execution of a portrait,
y have been, and are, so exceedingly
ious in various masters, that a discus-
n of them would lead to an endless la-
nth.

Nothing varies more quickly, more
cernibly, or more frequently, than
colour of a sitter's face. Great care
st therefore be taken to establish an
form judgment of the sitter in this
pect also; for the colouring of the
or complexion, being an effusion of
ure, leading to discover the true tem-
s of persons, exactness of imitation
e becomes essential to the exhibition
character. It may be therefore expedi-
to watch the first moments of the ap-
rance of colour in the sitter, who,
ner or later, from a continuance in
e posture, loses those spirits, which, at
first sitting down, gave to every part of
face a livelier and fresher hue. There
o other point of painting in which the
adox may be more truly asserted,
hat the painter who only paints what he
s will never arrive at perfect imita-
."

he other classes of painting are suffi-
ntly denoted by their names, except-
the last, viz. *still life*, of which it may
requisite to add that the term is ap-
ed to all inanimate objects, but chiefly
household furniture, ornaments, and
truments of use, &c.

Modes and materials of painting. The
ferent modes of painting now in use
r s

Oil painting; preferable to all other
thods, as it admits of a perfect gra-
tion of tints in the most durable
all materials, except those of Mosaic
inting; in which an imitation of
ects is produced by the junction of
great number of small pieces of natural marble of different colours fixed in stucco, a mortar, so that if the mortar is well prepared, the monuments of this art may descend to the most remote ages.

Fresco painting; which is performed with colours diluted in water, and laid on a wall newly plaistered with which they incorporate, and are sometimes as durable as the stucco itself.

Crayon painting; in which colours, either simple or compound, are ground in water mixed with gum, and made into small rolls of a hard paste, which are then used on paper or parchment.

Miniature painting; which consists of colours prepared with water or gum, and laid on vellum or ivory.

Enamel painting; which is performed on copper or gold, with mineral colours, dried by fire. This method is also very durable.

Wax, or encaustic painting; performed by the mixture of wax with the varnish and colours.

Painting on glass, too well known to need description, and performed by various methods.

Painting in distemper; which is with colours mixed with size, whites of eggs, or any thin glutinous substance, and used on paper, linen, silk, board, or wall.

Painting in water-colours, more properly called limning; it is performed with colours mixed with water, gum, size, paste, &c. on paper, silk, and various other materials.

To these is to be added eludoric painting, consisting of a mixed use of oil colours and water.

Method of painting in fresco. Before you begin to paint, it is necessary to apply two layers of stucco on the place where your work is to be executed. If you are to paint on a wall of bricks, the first layer is easily applied; if of freestone closely joined, it is necessary to make excavations in the stone, and to drive in nails or pegs of wood, in order to hold the layer together.

The first layer is made of good lime and a cement of pounded brick, or, which is better, river-sand, which latter forms a layer more uneven, and better fitted to attach the second smooth layer to its surface. The antients appear to have possessed the art of making this species of mortar superior to any now in use.

Before applying the second layer, on which you are to paint, it is requisite that the first is perfectly dry, as the lime while moist emits a pernicious effluvium.

When the first layer is perfectly dry, wet it again with water, in proportion to its dryness, that the second layer may more easily incorporate with it.

The second layer is composed of lime, slaked in the air, and exposed for a whole year, and of river-sand of an equal grain, and moderately fine. The surface of this second layer must be uniformly even. It is laid on with a trowel; and the workman is provided with a small piece of wood, to remove the large grains of sand, which, if they remained, might render the surface uneven.

To give a fine polish to this surface, a sheet of paper should be applied on it, and

in fresco must be executed r
as there is not time to retouch
strokes of the brush with good
will first have taken care to pr
self with large finished dra
chalk, or paintings in distemp
same size as the work which
paint, so that he shall have on
these drawings on the wall.

The painter traces the outl
figures on the plaister, by passi
point over them, or pricking th
ly and passing very finely
charcoal through the pricked h

All natural earths are good for
in fresco. The colours are gr
tempered with water. It is to b
ed, that all the colours used in
thod of painting brighten as t
dry, excepting the pavonazzo o
nish, the brownish red ochre, r
and the blacks, particularly t
are passed through the fire.

The best colours are white, m
lime, and white marble-dust (th
tional quantity of the latter de
the quality of the lime, and must
by trial, as too great a quantity o
dust will turn the colour blac
tramarine blue, the black of
yellow ochre, burnt vitriol, ro
green of Verona, Venetian bl
burnt ochre.

Other colours, which require to
with greater precaution, are a
enamel blue, and cinnabar. Enam
must be applied instantaneous
while the lime is very moist, othe
will not incorporate; and if you
with it, you must do it an hour o
after the first application of it, in
increase its lustre.

Cinnabar has a splendour alm
yond all other colours, but it
when mixed with lime. It may
ever, be employed in places not e
to the air, if

ster with glove-skin paste, and er the cloth; when dry, add ano- er of the same paste.

e colours are pounded with wa- as the painter wants them for t, he tempers each with paste-wa- if he will only make use of yolks , he takes of water one glass, to e adds an equal quantity of vine- yolk, white, and shell of an egg, n ends of fig-tree branches cut in- pieces, and beats them all well r in an earthen pan.

wishes to varnish his picture when , he must rub it with the white of vell beaten, and then put on a oat of varnish.

inting. The principal advantage ainting over other methods con- he colours drying less speedily, it allows the painter to finish, , and retouch his works, with care and precision. The colours ng more blended together, pro- ore agreeable gradations, and a licate effect.

e superior beauty of oil-painting s on the vividness and delicacy ible tints, we shall present the with the best rules drawn from l study of the works of Vandyck nbrandt, two of the most remark- lourists in different styles. These e arranged in so easy a method, student may be led, step by step. all the difficulties of this nice and g progress.

Of painting flesh.

ipal colours from which all the the flesh are made, and their es in painting.—Flake-white is white known to us. This colour be ground with the finest poppy can be procured.

e comes forward to the eye with s and reds, but retires with blues eens. It is the nature of all whites into whatever ground they are , therefore they should be laid on grounds.

y-black is the best black: it is a co- which mixes kindly with all the . It is the true shade for blue; hen mixed with a little Indian red, e best general shadow-colour, that e used. It is generally ground inseed-oil, and used with drying

k is a cold, retiring colour.

amarine is the finest blue in the : it is a tender retiring colour, and glares, and is a beautiful glazing . It is used with poppy-oil.

ssian-blue is a very fine blue, and a working colour: it is ground with d-oil, though nut-oil is more proper. uld never be used in the flesh, but een tints and the eyes.

it-ochre is a good mixing colour, f great use in the flesh: it is usually d with linseed-oil, but nut-oil is . All yellows are strengthened red, and weakened with blues and s.

ht red is nothing but fine light ochre . This and white, in mixing, produce a most perfect flesh-colour. It is a beautiful, clean colour; but too strong for the white, and therefore will grow darker. It should be ground and used with nut-oil.

No vermillion but what is made of the true native cinnabar should be used. It will not glaze; but is a fine colour when it is glazed. It is ground with linseed-oil, and should be used with drying oil.

Carmine is the most beautiful crimson; it is a middle colour, between lake and vermillion: is a fine-working colour, and glazes well. It should be ground with nut-oil, and used with drying oil.

Lake is a tender deep red, but of no strong body; therefore it should be strengthened with Indian red. It is the best glazing colour that can be used. It is ground with linseed-oil, and used with drying oil.

Indian red is a strong pleasant-working colour, but will not glaze well; and when mixed with white, falls a little into lead: it is ground and used as the lake.

Brown pink is a fine glazing colour, but of no strong body. In the flesh it should never join or mix with the lights, because this colour and white antipathize, and mix of a warm dirty hue; for which reason their joinings should be blended with a cold middle tint. In glazing of shadows it should be laid before the other colours that are to enrich it: it is one of the finishing colours, and therefore should never be used in the first painting. It is strengthened with burnt umber, and weakened with terraverte; ground with linseed-oil, and used with drying oil.

Burnt umber is a fine warm brown, and a good working strong colour: it is of great use in the hair, and mixes finely with the warm shade.

Principal tints, composed from the foregoing principal colours, and necessary for painting flesh.

Light red tint is made of light red and white: it is the best-conditioned of all colours, for the general ground of the flesh. With this colour and the shade tint, you should make out all the flesh, like claro-obscuro, or mezzotinto. Remember, that this colour will grow darker, because it is in its nature too strong for the white; therefore you should improve it, by mixing vermillion and white with it, in proportion to the fairness of the complexion.

Vermillion tint is only vermillion and white mixed to a middle tint: it is the most brilliant light red that can be. It agrees best with the white, light red, and yellow tints.

Carmine tint is carmine and white only, mixed to a middle tint; it is, of all colours, the most beautiful red for the cheeks and lips: it is one of the finishing colours, and should never be used in the first painting, but laid upon the finishing colours without mixing.

Rose tint is made of the red shade and white, mixed to a middle degree, or lighter: it is one of the cleanest and most delicate tints that can be used in the flesh; for clearing up the heavy dirty colours.

greens, and with the purples. No colour is so proper blending down, or softening the ligl into keeping.

Lead tint is made of ivory-black a fine white, mixed to a middle degre it is a retiring colour, and therefc is of great use in the gradations, and the eyes.

Green tint is made of Prussian bl light ochre, and white. This colour w dirty the lights, and should be l: sparingly in the middle tints. It is most use in the red shadows, where tl are too strong.

Shade tint is made of lake, Indian r black, and white, mixed to a beaut murrey colour, of a middle tint. This the best mixture for the general grou of shadows. It mixes well with lights, and produces a pleasant cl colour, a little inclined to the redd pearl. As all the four colours of its co position are of a friendly sympathiz nature, so consequently this will be same, and therefore may be easily cha ed by the addition of any other lours.

Red shade is nothing but lake an very little Indian red. It is an cellent working colour, and a good zer: it strengthens the shadows on shade tint, and receives, when it is the green and blue tints agreeably. is a good ground for all dark shadows.

Warm shade is made of lake brown pink, mixed to a middle degr It is a fine colour for strengthening shadows on the shade tint, when t are wet or dry. Take care that it d not touch the lights, because they mi a dirty colour, and therefore sho be softened off with a tender tint.

Dark shade is made of ivory-black ar little Indian red only. This colour mi shadows is glazing; and no other method than glazing can leave such brilliancy and beauty as they ought to have. If you begin the first painting with glazing, it will stare, and be of no use; and the solid colours which are laid on it, will look heavy and dull; therefore, all shadows and colours that are to be glazed should be done with colours of a clean solid body, because the glazing is more lasting, and has the best effect, on such colours. Remember to leave no roughness, that is, none such as will appear rough, and interrupt or hurt the character of the finishing colours; which, by examining the work, whilst it is wet, with a soft tool, or when it is dry with a knife, may be avoided, as it will easily take off the knots and roughest parts.

The light red and white improved is superior to all other colours for the first lay or ground; which should be always
done with a full pencil of a st
made brighter than the light, l
will sink a little in drying. Tl
the body and quantity of colou
stiffer it is laid, the less it will si
colour in drying will sink,
take, in proportion to its bod
colour it is laid on; therefore, al
of the flesh, if not laid on a ligh
must consequently change a li
the life, if there is not allowan
The shade tint for the shadov
fall into the rose tint, as the co
grows delicate; all which sl
lightly united, with a soft lon ed
hog-tool, to the lights, making
whole like mezzotinto. The g
ters very seldom softened or s
the colours; but in uniting the
they were very careful in prese ing the
brightness of their colours, and herefore
did not work them below the complexion; for to force or keep up a brilliancy in the grounds, can only be done with the whites, reds, and yellows, which methods will make up for the deficiency of the white grounds; therefore, the first painting should be left bright and bold, and the less the colours are broken the better. You should forbear using any colours that will produce them, and be contented to add what is wanting in the next painting; where, if you fail, a clean rag will restore the first ground.

Second painting, or second stage.

The second painting begins with laying on the least quantity that can be of poppy-oil; then wipe it almost all off, with a dry piece of a silk handkerchief.

The second painting is also divided into two parts: one the first lay of the second painting, which is scumbling the lights, and glazing the shadows; the other, finishing the complexion with the virgin tints,
as far as you can, without

bling is going over the
ey are to be changed,
tints or some other of
rs, such as will always
the complexion, with
, but such parts only
as require it, otherwise the beauty of the first painting will be spoiled.

The light red tint improved is the best
colour for scumbling, and improving the
complexion in ge al. Where the sha-
dows and drawi re to be corrected,
you should do it the shade tint, by
driving the colou ry stiff and bare, that
you may the easie retouch and change it
with the finishing ints. Some parts of the shadows should be glazed with some of the transparent shadow-colours, such as will improve and come very near to the life; but be sure not to lay on too much of it, for fear of losing the hue of the first painting, the ground of which should always appear through the glazing. Be very careful in uniting the lights and shades, that they do not mix dead and mealy; for the more the lights mix with the shades the more mealy the shades will appear. Thus far the complexion is prepared and
der to receive the virgin

Go over the complexion with
These are the colours
the colouring to the
n, both in the lights and

e done in the same man-
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inting: that is, with the
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without softening. Leave
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ntent to leave off whilst
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uired for the next sit-
mpting the finishing tou-
he other is dry, you will lose
drawing, and your colours
come of a dirty hue.

Third painting, or finishing.

It is to be supposed, the complexion now wants very little more than a few light touches; therefore there will be no occasion for oiling.

Begin with correcting all the glazing first, where the glazing serves as a ground or under part; then determine what should be done next, before you do it, so that you may be able to make the alteration on the part with one stroke of the pencil. By this method you preserve both the glazing and the tints; but if it happens that you cannot lay such a variety of tints and finishing colours as you intended, it is much better to leave off while the work is safe and in good order; because those few touches, which would endanger the beauty of the colouring, may easily be done, if you have patience to stay till the colours are dry; and then, without oiling, add those finishings with free light strokes of the pencil.

Of painting draperies.

In order to shew the nature and different degrees of colours of tints used in painting draperies we must first determine how many divisions are absolutely necessary to make the first lay of colours, and after that the reflections and finishing tints.

The right method of painting draperies in general is to make out the whole, or the first lay, with three colours only, viz. the lights, middle tint, and shade tint.

Observe that the lights should rather incline to a warmish hue: and the middle tint should be made of friendly-working colours, such as will always mix of a clean, tender, coldish hue. The shade tint should be made of the same colours as the middle tint, only with less light; therefore this tint will also mix of a tender clean colour. The beauty and character of the folds, the shape, attitude, and principal lights and shades, are all to be considered, and made with these three colours only; which should be done to your satisfaction, before you add any of the reflects, or finishing tints.

The reflections of draperies and satins are generally productions of their own, and are always lighter than the shadows on which they are found; and being produced by light, will consequently have a light warm colour, mixed with the local colour that receives them. Here it will be necessary to notice the general method of managing the colours of the first lay, and those of the reflections and finishing tints.

In the first lay, the high lights should be laid with plenty of stiff colours, and then shaped and softened into character with the middle tint very correctly. Where the gradations of the lights are slow, as in the large parts, it will be proper to lay the middle tint first at their extremities, with a tool that will drive the colour, and leave it sparingly; because the lights will mix and lie the better upon it. Next make out all the parts of the shadows with the tint driven bare. After this comes the middle tint, for the several lights and gradations; which should be very nicely wrought up to character without touching any of the high lights which finish the first lay.

The reflects and finishing tints are in general the antipathies of the first lays: they will, without great care, dirty the colours on which they are laid; and therefore should be laid with a delicate light touch, without softening. If it is overdone, endeavour to recover it with the colour of the part on which it was laid: this may be done directly, or when it is dry. Whether the reflects proceed from the same colour, or any other, the method of using them is the same.

It often happens, that the colour of the cloth is very improper for the ground of the drapery; and when it is so, you should change it with those colours which are most proper to improve and support the finishing colours. This method of dead-colouring must consequently preserve them in the greatest lustre. In dead-colouring, you should lay the lights and shades in a manner so as only to shew a faint idea of them, with regard to the shape and roundings of the figure. If you have a design to work from, then it will be proper to make all the large and principal parts in their places; which should always be done with a colour that is clean, and lighter than the intended drapery, though in general of the same hue; and let the shadows lie no darker than a middle tint. These should be mixed and broken in a tender manner, and then softened with a large tool, so that nothing rough and uneven is left to interrupt or hurt the character of the finishing colours.

White satin. All whites should be painted on white grounds, laid with a good body of colour, because this colour sinks more into the ground than any other.

There are four degrees of colours in the first lay, to white satin. The first is the fine white for the lights; the second is the first tint, which is made of fine white and a little ivory black, mixed to an exact middle degree between the white and the middle tint. This colour follows the white; and it is with this you should shape the lights into character before you lay on any other: and take care that this first tint appears distinctly between the white and the middle tint, otherwise the beauty and the character of the satin will be spoiled.

The middle tint should be made of white, black, and a little Indian red. These three colours are very friendly, and mix to a beautiful clear colour of a pearly hue, which has the true brightness and warmth of the general hue of the satin. Remember to allow for the [illegible] changing a little to the lead. If there is occasion to make any part in the middle tint lighter, do it with the first tint only. This colour should also be laid sparingly before the white, in all the small lights that happen in the middle tint and shadows; on which you should lay the white with one light touch, and be careful not to cover all the parts that were made with the first tint; if you do, it will spoil the character, and look like a spot, for want of the softening edge or border, which must be between the white and the middle tint. The shade tint should be made of the same colour as the middle tint, but with less white, so that it is dark enough for the shadows in general; with which make out all the parts of the shadows nicely to character, which is the work of the first lay.

Next follow the reflects and finishing tints.

Brown ochre, mixed with the colour of the light, is the most useful colour in general for all reflects in draperies, that are produced from their own colours. All accidental reflexes are made with the colour of the parts from which they are produced, and the local colours that receive them. There are but two reflecting tints wanted for draperies in general: one should be lighter than the middle tint, the other darker. These colours may be a little changed on the pallet with the first and middle tints, as occasion requires, or lightly broken on the part that receives them; but this last method is not so safe as the other. The tint sufficient for blending the dark shadows to the mellow tender hue, is made with the shade tint and a little brown ochre, which should be laid on very sparingly, with soft light

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t lay of colours for blue is divided
degrees or tints. First make
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The greatest fault in the colouring of draperies is the painting the shadows with strong glaring colours, which destroy the beauty of the lights. This is not only the reverse of art, but of nature, whose beauty always diminishes in proportion with the lights. For this reason, take care to blend and soften the shadows with such friendly colours as will agree with their local character and obscurity. Here observe, that glazing the middle tint, which is made of black and white, will not produce a colour so blue as if it had been prepared with Prussian and white; yet this colour will preserve the beauty of the lights in the highest perfection, by reason of its tender obscure hue, when the blueness of the other would only diminish them. This method of glazing the blue is the general rule for all glazing.

When glazing blue, the lights may be glazed with ultramarine, though all the other parts are done with Prussian. This method saves a great quantity of that valuable colour, and answers the purpose as well as if it had been done with ultramarine.

Though this general method of painting satins is to make the first lay of colours with three degrees, or tints, yet you should understand, in using them, that they produce two more; for the mixing of two different colours together on the cloth will make another of a middle tint between them; so it is with the lights and middle tints, and with the middle tint and shade tint: the first answers to the first tint in white satin, and the last will consequently be a sort of gradating, or half shade.

If the lights and middle tint mix to a beautiful clean colour of a middle hue. between both, there will be no occasion for a colour to go between them, as in blue satin: but if in mixing they produce a tint inclined to a dirty warm hue, then another of a sympathizing nature should be laid between them, in order to preserve the beauty of the lights, as the first tint in the white satin; for if it was not so the red in the middle tint would certainly dirty and spoil the white.

It is highly necessary to understand these principles of the first lay of colours, in order to have a perfect knowledge of the general rule of colouring.

Scarlet and crimson. A light yellow red, made of light ochre, light red, and white, is the proper ground for scarlet; the shadows are Indian red, and in the darkest parts mixed with a very light black.

The second painting should be a little lighter than you intend the finishing colour, that is, in proportion to the glazing, which will make it darker.

The high lights are vermilion and white for satin and velvet, and vermilion for cloth. The middle tint is vermillion, with a very little lake or Indian red: the shade tint is made with Indian red and lake, with the addition of a little black in the darkest shadows. The difference between scarlet and crimson is, that the high lights of crimson are whiter, and the middle tint is made darker. Their reflects are made with light red and vermillion. The high light should be laid and managed in the same manner as those of the blue, for fear of dirting them: and sometimes they require to be touched over the second time before we glaze them. The more the colours of the second painting are drove, the easier and better they may be managed to character; but the high lights should have a good body of colour, and be left with a delicate light touch. After it is well dry, finish with glazing the whole with fine lake, and improve the reflects and shadows. Remember that the scarlet requires but a very thin glazing; and it is better to glaze the crimson twice over, than lay too much at once painting.

Pink colour. There are two different methods of painting a pink colour; one is by glazing, the other is done with a body of colours at one painting. The same grounds do for both; which should be a whitish colour, inclining to a yellow, for the lights; and Indian red, lake, and white, for the shadows.

The second painting, for the glazing method, is done with the same colours, and a little vermilion and white for the high lights. When it is dry, glaze it with fine lake, and then break and soften the colours into harmony directly.

The other method is to make the high lights with carmine and white; the middle tint with lake, white, and a little carmine: and the shadows with lake and Indian red, with a little vermilion for the reflections. But remember, the shadows will require to be broken with some tender obscure tint.

Yellow. The ground for yellow should be a yellowish white for the lights, and a mixture of the ochres for the shadows.

There are the same number of tints in the yellow as there are in the white satin, and the method of using them is the very same. The lights are made with king's yellow, ground with clean good drying oil. The first tint is light ochre, changed with a little of the pearl tint, made with the dark shade and white, which should be laid and managed as the first tint in white satin. The middle tint is a mixture of the light and brown ochre, softened with the pearl tint. The shade tint is made with brown pink and brown ochre; these belong to the first lay.

The reflects are light ochre, and sometimes in the warmest parts mixed with a little light red. The shadows are strengthened with brown pink and burnt umber.

Green. The proper ground for green is a light yellow green, which is made of light ochre, a little white, and Prussian blue, for the lights, and the ochre, brown pink, and Prussian, for the shadows.

The finest green for draperies is made of king's yellow, Prussian blue, and brown pink. The high lights are king's yellow, and a very little Prussian; the middle tint should have more Prussian; and the shadow tint is made with some of the middle tint, brown pink, and more Prussian; but the darkest shadows are brown pink and a little Prussian. The lights and middle tint should be managed in the same manner as those of the blues. The shadow tint should be kept entirely from the lights, because the brown pink that is in it will, in mixing, dirty them, as the black does those of the blues. Remember to allow for their drying a little darker; and that the king's yellow must be ground with good drying oil; for the longer it is drying, the more it will change and grow darker; and the sooner it is used, the better it will stand. It is proper to have two sorts of king's yellow, one to be very light, for the high lights of velvet.

Changeable Colours. Changeable colours are made with four principal tints, viz. the high lights, middle tint, shade tint, and reflecting tint.

The greatest art lies in finding the exact colour of the middle tint, because it has more of the general hue of the silk than any of the others. The shade tint is of the same hue with the middle tint, though it is dark enough for the shadows. The high lights, though often very different from the middle tint, should be of a friendly-working colour, that will, in mixing with it, produce a tint of a clean hue.

The method of painting silks is to make out the folds with the shade tint, and then fill them up in the lights with the middle tint. This first lay should be done to your satisfaction before you add any other colours; and the softer the middle tint is used, the better the high lights may be laid upon it. The reflecting tint falls generally upon the gradating half-shades, and should be laid with tender touches sparingly, for fear of spoiling the first lay.

This method of painting answers for all coloured silks, as well as changeable, with this difference only; that the plain colours require not so much art in mixing the tints, as the changeable do. The last part of the work is the finishing and strengthening the shadows with an obscure tint, a little inclining to a mellowish hue; such as will not catch the eye, and interrupt the beauty of the lights.

Black. The best ground for black is light red for the lights, and Indian red and a little black for the shadows.

The finishing colours are, for the lights, black, white, and a little lake. The middle tint has less white, and more lake and black: the shade tint is made of an equal quantity of lake and brown pink, with a very little black.

The method of painting black is very different from that of other colours; for as in these the principal thing is to leave their lights clear and brilliant; so in black, it is to keep the shadows clear and transparent. Therefore begin with the shade tint, and glaze over all the shadows with it. Next lay in the darkest shadows with black, and a little of the shade tint, very correctly. After that, fill up the whole breadth of lights with the middle tint only. All which should be done exactly to the character of the satin, velvet, cloth, &c. and then finish with the high lights.

Here observe, the ground, being red, will bear out and support the reds, which are used in the finishing colours. The lake in the lights takes off the cold

more beautiful colour. If
t was of any other colour
ureat warm hue, the sha-
onsequently be black and
se no other colours can pre-
n brilliancy which is want-
lows of the black, like lake
ık. Black is of a cold heavy
always too strong for any
therefore you should make
in using it. There will be
in satin, which should be
ose of other colours; but
oe made of strong colours,
t umber, or brown ochre,
little shade tint.

grounds mentioned for the
absolutely necessary for the
nearest figures in a picture,
e portrait, or the like; yet
ich are placed behind the
front figures, their grounds
s be fainter in proportion to
ishing colours.

colours used in linen are
ose in white satin, except
which is made of white and
ashes, instead of the black,
a very light bluish tint.

l-colouring, take particular
grounds are laid very white
the lights. The shadows are
ack, white, and a little In-
the middle tint of white sa-
hould be left very light and
ler to support the finishing

l painting begins with glaz-
ghts, with a stiff pencil and
nly, driven bare, without
il. The shadows may be
ith poppy-oil, and some of
ey were made of. This is
on which you are to follow
shing colours directly. The
f white satin is the best co-
eneral hue of the shadows.
l white, in different degrees,
the parts to character, with
uches, without softening;
large long pointed pencil and
ay the high lights very nicely
ke. After this comes the fine
int, which should be mixed
id in the tender gradations,
ly and lightly, without filling

, the first lay should be left
stinct; the more it appears
It is the overmixing and join-
lours together, which spoils
f the character; therefore, it
et it dry before we add the
inishing tints.

od of letting the beautiful
dry, before you add the warm
l harmonizing tints, prevents
mixing and dirting each

pal blending colours used in
re the yellow tint, green tint,
; which last is made of lake.
nd white. Glazing the pearl
lour with white, though it
wer our purpose at the time
one, will certainly sink and
e grounds on which it is laid;
u should *make the dead* colouring as white as you intend the finishing colours, by reason they will sink a little in proportion to the colour of the cloth, which the glazing with pure white only will recover.

Of painting back grounds.

The principal colours that are necessary for painting of back grounds, as walls, buildings, or the like, are white, black, Indian red, light and brown ochre, Prussian and burnt umber: from which the eight principal tints are made, as follows: 1. Pearl is made of black, white, and a little Indian red. 2. Lead, of black and white, mixed to a dark lead colour. 3. Yellow, of a brown ochre and white. 4. Olive, of light ochre; Prussian and white. 5. Flesh, of Indian red and white, mixed to a middle tint. 6. Murrey, of Indian red, white, and a little black, mixed to a kind of purple, of a middle tint. 7. Stone, of white, umber, black, and Indian red. 8. Dark shade, or black and Indian red only.

Here the lead tint serves for the blues, the flesh tint mixes agreeably with the lead, and the murrey is a very good blending colour, and of great use where the olive is too strong; the umber, white, and dark shade, will produce a fine variety of stone colours; the dark shade and umber, used plentifully with drying oil, make an excellent warm shadow-colour. All the colours should be laid with drying oil only, because they mix and set the better with the softener.

Where the marks of the trowell are so strong in the priming of the cloth, that one body of colours will not be sufficient to conceal it, lay a colour to prevent it, which should be dry before you begin with those parts you expect to finish at once painting.

Process. The process of painting back ground is divided into two parts in stages; the first is the work of the first lay, the second that of the finishing tints.

Begin the first lay from the shadowed side of the head; and paint the lights first; from them go into the gradations and shadows, which should be done with a stiffish tool, very sparingly, with the dark shade and white, a little changed with the colours that will give it more of the required hue, but very near in regard to tone and strength, leaving them like mezzotinto.

The dark and warm shadows should be laid before the colours that join them. This do with the dark shade and umbes, driven with drying oil. If those colours were laid on first, they would spoil the transparency, which is their greatest beauty. The more the first lay is driven, the easier and better you may change it with the finishing tints, therefore you may lay them with the greater body.

The second part is to follow directly, whilst the first lay is wet, with those tints that are the most proper to harmonize and finish with.

Begin with the lights first, and remember, as you heighten and finish them, to do it with warmer colours; and let those be accompanied with fine tender cold tints. The lightest parts of the ground should be

will melt and sweeten altogether,
a manner, as will seem surprizingly
ed. Remember the tints will sin
lose a little of their strength and
in drying. All grounds, as wal
should be finished at once paintin
if they want to be changed, glaze
with a little of the dark shade and
oil, driven very bare: on which,
few light touches of the colour
wanting, you may improve thei
The dark shadows may also be stren
ed and improved by glazing, which
be done after the figures are
finished, for fear of making the
strong.

Curtains should be dead-coloured
we paint the ground; and should be
with clean colours, of a near hue
intended curtain, such as will suppo
finishing colours; do it with a
sort of keeping, and near in rega
their tone in the lights, but much
in the shadows; all which should be
ed and broken with the colours
ground. It will often happen, th
cannot make the folds the first pain
we should then leave the masses of
and shadow, in regard to the keep
the picture, broad and well united
ther, such as may seem easy to fini

The colours of the landscapes, in
grounds, should be broke and sof
also with those of the parts which
them. This method will make al
parts of the ground, as it were, o
piece.

The sky should be broke with the
and the flesh-tints. The murrey tin
great use in the grounds of distant
jects; and the umber and dark shad
the near grounds. The greens shoul
more beautiful than you intend them
cause they will fade and grow dar
After all is painted, go over the w
very lightly with the softener, as you
the grounds, which will make it

d so as best to find and shew their
al parts. All the grounds of the
rould be laid or rubbed in, enough
leave an idea of their shapes and
rs faintly. The ground of their sha-
must be clean, and lighter than their
g colours.
inting the lights, it is better to in-
nore to the middle tint, than to the
gh lights; and observe to leave
vith a sufficient body of clean co-
which will preserve the finishing
better; all which may be done
few tints. After this, go over the
vith a sweetener very lightly, which
ten and mix the colours agreeably
shing.

Second painting.

n with the sky, and lay in all the
and colours of the horizon; then
hem; after that, lay in the general
re clouds and finish on it with the
hts, and the other tints that are
, with light tender touches; then
he whole with a sweetener very
The finishing of the sky should be
l at one painting, because the ten-
racter of the clouds will not do so
when the whole is wet. Observe,
stiffer the azure and colours of
zon are laid, the better the clouds
painted upon them.
reatest distances are chiefly made
colour of the sky; as they grow
and darker, glaze and scumble the
ry thin, with such glazing shadow
as come nearest to the general
he group the objects are in. This
should be understood of a darkish
nd that the first painting or dead-
hould be seen through it distinct-
his lay, or ground, add the finish-
urs.
supposing this glazed ground pro-
lapted to the object and place, it
easy to find the other colours,
re wanted for the lights and finish-
he same; but in laying them, you
ake care not to spoil the glaz-
erefore be very exact in making
olours on the pallet, and then
to lay them with light free
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e we proceed any farther, it will
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lazing colours.
terreverte, Prussian blue, and
pink, are the four principal. The
u manage them like Indian ink,
more distinctly you leave them,
er their transparent beauty will
nd appear, provided you do it
od drying oil. After these four
colours, burnt umber is a very good
warm brown, and of great use in
en grounds and nearest parts; but
agreeable colour for the darkest
, is the dark shade improved with
t is a fine warm shade; mixes
lously with all the lights, as well
ows; and is excellent in the
and bodies of trees, and in all
buildings.
out all the ground of the objects
h glazing-shadow-colours as seem
o the natural hue of the object in that situation; but as the principal glazing colours themselves are often too strong and glaring, they should therefore be a little changed, and softened with such colours as are of a near resemblance to themselves and the objects; thus, if it is in the distances, the terreverte and the azure, which are the principal glazing colours, may be improved and made lighter with some of the sky tints; and as the distance comes nearer, with the purple. In the middle group, the terreverte and Prussian blue may be changed with some of the green tints; such as are made without white, for white is the destruction of all glazing colours. As you approach the first group, there is less occasion for changing them; but the fore-ground and its objects require all the strength and force of glazing, which the colours are capable of producing.

After this glazing ground, follow with strengthening the same in the shadows, and darkest places, in such manner as will seem easy to finish; which is the first lay of the second painting.

The colours that come next for finishing, are in the degree of middle tints: these should be carefully laid over the greatest breadth of lights, in such manner as not to spoil and cover too much of the glazing. Do it with a good body of colour, as stiff as the pencil can agreeably manage. Remember, the colours of the middle tint should be of a clean beautiful hue. According to these methods, it will be easy to finish all the second painting down from the sky, through the middle group. As you come to the first group, where all the objects should be perfectly finished, finish their under or most distant parts before you paint any of the other, which appear nearer. Observe this method down to the last and nearest objects of the picture: and where it so happens that painting one tree over another does not please, forbear the second until the first is dry. Thin near trees of different colours will do better, if you let the under parts dry before you add the finishing colours.

Third and last painting.

If oiling is necessary, lay the least quantity that can be; which should be done with a stump tool or pencil, proportioned to the place that is to be oiled, so as to oil no more than is wanted: then wipe the whole place that is oiled, with a piece of silk handkerchief.

When going to finish any objects, remember to use a great variety of tints, very nearly of the same colour, but most of all when finishing trees. This gives a richness to the colouring, and produces harmony. The greens will fade, and grow darker; therefore it is highly necessary to improve and force them, by exaggerating the lights, and making an allowance in using them so much the lighter. For the same reason, take great care not to overcharge and spoil the beauty of the glazing; for if you do, it will be dull and heavy, and will consequently grow darker.

The method of painting near trees is, to make the first lay very near to nature, leaves the colours in the greatest perfection; because most of the work may be done with scumbling and glazing, and some parts without oiling. The lights also may be laid with a better body of colour, which will not be mixed and spoiled with the wet ground.

The figures in the landscape are the last work of the picture; those in the fore ground should be done first, and those in the distances should be done next; for after the figures in the first and farthest group are painted, it will be much easier to find the proportions of those in the middle parts of the picture. And observe, that the shadows of the figures should be of the same hue, or colour, with those of the group, or place they are in.

Miniature.

The art of painting in miniature is of very antient date. It is practised either on vellum or ivory.

The best method, in painting on vellum is to glue the edge of the vellum to a copper-plate or board, over which it is strained, in this manner: Let your vellum be every way a finger's breadth larger than what you strain it on. Moisten the fair side of the vellum with a piece of fine wet linen, and put a piece of white paper to the other side. Then apply it to the plate or board, stretching it equally in all directions, lap the edges nicely round and glue them, taking care to let no glue pass under the part of the vellum on which you mean to paint. When the glue dries, and the edges of your vellum are thus fastened, you may proceed with your work: or you may (agreeably to the practice of some painters) previously give the vellum a light wash of white lead well purified, to serve as a ground.

But ivory being the material most fre-

ly mixed with other co-
ng warm fleshy tints, which
duced without it. Its ex-
ency and its permanency
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ine is a fine bright crimson,
scarlet, and is rather an
; from it a variety of fine
made. There are various
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e best, the lighter sort be
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made from the shearings of
is a pleasing crimson co-
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licate subjects.
rmilion, when good, is a
d useful in miniature pic-
not to be freely used, its
ring it dangerous to mix
er colours; but by itself,
e parts that require ex-
ss, it is of wonderful ser-
y difficult to find the real
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ary.
or mineral cinnabar, or
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e is a method of preparing
bar, viz. Take six ounces
d eight of quicksilver, mix
hen set them on the fire,
sulphur is consumed, and
mains black, after this, it is
e in open pots, at the bot-
he cinnabar remains very
reaked with the lines, or
red, and others brilliant
en take it and purify it in
manner: grind it well in
a marble, put it into a
n vessel to dry, then put
nix it so that it be thorough-
m: then let it settle, and
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ine by inclination, and put
om of it, leaving it so all
eating the same charge four
ll the cinnabar is thorough-
Continue the process with
e white of an egg, which
ir water, pour it upon the
stir the whole about with a
ick; change this liquor two
as above, and keep the ves-
red from dust; when used
urs, temper it with gum-
mall quantity of saffron dis-
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s an excellent colour, not
ing the deep red parts, but
trong flesh tints, in bright
, and draperies.
ber is very greasy, and mix-
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y parts of miniature.
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nter of that name held it in,
ch brown in the world; in
g a more beautiful colour

than can be formed by the junction of any colours whatever. It is, in its natural state, rather coarse and sandy, but when prepared it amply repays the labour.

Lamp-black is useful for mixing in hair colour and in painting draperies. The smoke of a candle received on a plate, is found the best, being blacker than the common lamp-black.

King's yellow is a bright opaque colour admirably calculated for painting lace, gilt buttons, &c. &c. but is a rank poison, therefore should be cautiously used.

Flake white, or refined white lead, is not to be used by itself as a white, for to a certainty it will turn black, which circumstances should be nicely attended to by all artists. If used in miniature painting, for linen, &c. it should be immediately covered with a glass, which method is the only one which stands a chance of preserving its purity.

Among the above necessary colours, there are are three which require to be burnt; viz. terra di Sienna, umber, and lamp black. For this purpose, the two former are to be put in a crucible, which is to be covered and placed on a hot fire: and when you think that the lump of colour is hot through, take the crucible from the fire, and let the colour cool.

The lamp-black is to be prepared thus: Take some of the common kind; put it on a clean fire-shovel or plate of iron, over the fire: immediately on receiving the heat, it will begin to smoke, on the ceasing of which you will find your lamp-black freed from the oily substance it originally contained and fit for immediate use.

Gum-water. Choose the large white pieces of gum arabic, which are brittle and clear. Put them into a clean phial; and pour water on them, well strained and divested of all sandy particles. Let the gum-water be about the thickness of water-gruel, that is, so thick that you can feel it in your fingers. The fresher made, the better.

Grinding the colours, and preparing them for the pallet.—Provide yourself, if possible, with an agate flag and muller; but if that cannot conveniently be had, glass ones may answer, though not quite so well. The glass muller and flag must be lightly roughened with fine flour emery, which will give it a surface that will continue a long time. After being particularly careful that your flag, &c. are quite clean, lay some of the colour to be ground on it, bruising it whilst dry, gently with the muller; then put a few drops of water on it, and grind it very carefully, not making it too wet, as that will prevent it from keeping sufficiently under the muller. When you think it is finely ground in the water, take your pallet-knife, or a thin-edged piece of ivory, scrape your colour together in a little heap on your flag, which let dry for a short time, then add your gum-water to it gradually, having a piece of ivory near you, on which you are frequently to lay some of the colour with a camel-hair pencil, thin; and if you perceive the colour in the smallest degree to shine, when dry, it is gummed enough; then you are to scrape it off your flag and transfer it to your pallet.

no pencil can be superior to one mac
the common kind of hair. The error
prevalent amongst young minia
painters, is that of a very small penci
their work, vainly hoping, by the as
ance of such a one to execute their
ture with more neatness and accur
but in this, they will, by experience,
themselves mistaken ; the finest and
highly finished pictures being executed
a middle-sized pencil, the point of w
being not only sufficiently neat, but
its body containing a quantity of colou
fluid, enables the artist to give that
low firm touch which is so generally
mired by connoisseurs in the art.
young artist should choose a middle-s
pencil, with a good spring and point,
of which he will know by drawing the
cil lightly through his mouth, and to
ing it on his thumb-nail ; if he finds i
being moderately wet, to spring a
into its form, after being bent, it is a
sign ; but as there are many pencils
sessed of that quality, which are defi
in another material, one, namely, th
a good point, that must be very cauti
looked to, by turning the pencil roun
the nail, in every direction, observing
hairs at the point keep equally toge
of a length, and none shooting out o
ther side, (which is often occasione
the pencil maker putting the hair in
quill with a twist in it). All these de
being carefully guarded against, you
sure of being in possession of a very
cipal material for miniature painting.

Ivory.

**Method of choosing, bleaching, and
paring it.**--Of ivory there are various ki
the distinction of which in this art
very material consequence. Ivory, n
cut, and full of sap, is not easily to

ant spot perhaps to appear through,
: very part where your face is to be
ed.

tructions for mixing compound tints
for the face.

rple is formed of either ultramarine,
ian blue, smalt, or indigo, mixed
either carmine or drop lake. Ul-
rine, although the most beautiful
prilliant of colours by itself, yet in any
ure it loses that perfection, but still
as a sufficient share of brightness to
er it a desirable tint in the purplish
shadows of the face. Prussian blue,
d as before-mentioned, makes a
t or dark purple, according as the
tities of either colours are portion-
out indigo makes still darker, owing
great natural depth of colour. Small
carmine, or lake, form nearly the
tint as ultramarine, and may be used
y for the same purposes.
ey. Of grey tints there are various
-, according to the subjects they are
ired for. A warm grey tint may be
: by duly portioning burnt terra Si-
, Prussian blue, and drop lake; the
terra Sienna in it, the warmer the
the more Prussian blue and lake,
older. Another grey tint, used with
ss by some eminent miniature pain-
was composed of Prussian blue and
ese vermilion, but on account of the
nd manner with which vermilion in-
rates with any other colour, it re-
d a greater proportion of gum than
ary to make them work or keep to-
r. A third grey tint, which is an ex-
nt one, is formed of drop lake, sap-
, and Prussian blue.
ve tints. A very fine olive tint is
ed of gall-stone, Nottingham ochre,
armine, or lake; and another of sap-
and lake simply.
hair tints. A beautiful hair colour,
r dark or light, according to the quan-
of colours, is made of carmine, lamp-
, and sap-green. The manner of form-
t is only to be acquired by practice:
when once attained, will be found
h the time of the trial. That very diffi-
tint which is often to be met with in
lren's hair, by the proper junction of
e colours will be produced to perfec-
. Other hair tints may be made of
de Cassel simply, or by the addition
mp black. Some excellent painters
e all their hair tints of burnt terra Si-
, lamp-black, and Nottingham ochre,
latter being added only when there
ght hair wanting to be represented.
nt umber has been substituted for ter-
ienna, along with the lamp-black, and
ns a good tint; but care must be taken
void either the greenish or reddish
, which it is apt to produce.
ints for fine linen, gauze, &c. Of all
s in transparent painting, such as are
miniature works of the present day,
re are none more difficult to ascertain:
the delicacy, not only of mixture,
the delicacy of touch, conveys the
of beauty in the thinness and folding
ne linen or gauze, the true painting
which throws a veil over the defects in

other parts of the picture. We shall therefore only observe, that any of the tints, under the head of grey, will, properly managed, answer the purpose. Having now pointed out the manner of preparing the delicate transparent tints for miniature painting, we proceed to treat of the grosser ones, namely, those for draperies.

Of colours proper for men's draperies.

We shall, under this head, make some general observations; the first of which is, that in all cloth draperies for men's portraits, it is necessary to add some flake white; as it not only gives the colour the dead appearance which cloth exhibits, but likewise its being incorporated with the flake white, gives it a body which makes the flesh tints appear to more advantage. The next observation is, that in grinding up your draperies, you are to make them appear several degrees lighter in colour than you want them to be when dry, for this reason; the flake white is a colour so very heavy, that, after you float in your coat, it will sink to the bottom, and leave your colours several degrees darker than when it was wet; and finally you are not to be too heavy or thick in floating in your draperies, but merely to see that your colour is evenly spread over the part.

There are four modes of working in miniature painting; namely, floating, washing in, handling, and marking. The first process which is floating, and is chiefly used for draperies, is thus performed: Having marked with your pencil where your drapery is to be, grind up your colour on your flag, (not putting a quantity of gum water, that would make it shine, as it would frustrate your purpose); then take a large soft hair pencil, and, having previously laid your ivory on a very level table, fill your pencil plentifully with the colour, and lay it quick all over the parts of the ivory you want covered, seeing that it runs on every part equally, which, if kept in a proper fluid state, it will readily do: then lay it in some place to dry, where it is not likely to receive dust, when you will have a fine level surface, ready to work the shadows of your drapery on in a couple of hours. Washing in is performed when your picture is on your desk, by filling your pencil moderately with colour, and giving a very broad stroke rather faintly, as the contrary would not answer; this manner is chiefly used in beginning the hair, back grounds, and likewise in laying on the general flesh tint of the face. It is also used in the first touches of the dark shadows, which ought to be begun faint and broad. Handling is the manner in which all the fleshy parts of the miniature must be worked, after the first washing in; and lastly, marking consists in the sharp-spirited touches given to the different features, in order to give that animated appearance so necessary to constitute a fine picture.

Black drapery is formed of lamp black burnt, and flake white; and must be laid in with a good deal of the latter, as otherwise it will be very difficult to manage the

A queen's made of burnt Roman ochre, a little lamp-black and lake, with flake-white amongst it.

Claret colour may be well represented by a mixture of terra de Cassel, a little lamp-black, and lake. The more black and lake, the deeper the colour.

Dark brown can be formed by a junction of Nottingham ochre, lake and lamp-black.

Lilac is made of carmine, Prussian blue, and flake white.

Grey can be formed only of lamp-black, flake-white, and the smallest quantity of lake laid in very thin.

Reddish brown is best made of Indian red, very little lamp-black, and flake white.

Scarlet is a colour very difficult to lay down rules for making, as in some pictures it is dangerous to make it too bright, for fear of hurting the effect of the face by its brilliancy catching the eye too readily; consequently, if the subject you are painting from life is very pale, you run a very great risk by annexing a very bright scarlet to his picture. We shall therefore only mention that a very bright scarlet is made of Chinese vermilion and carmine, ground together (without any flake and white); and if you want it still rendered brighter, when it is dry, fill your pencil with plain carmine, mixed with thin gum-water, and glaze over it nicely; but if, on the contrary, you wish to sadden, or take away a share of its brilliancy, add a little flake white to it, and that will have the desired effect.

Of painting the face in miniature.

You are first to provide yourself with a mahogany desk for painting on, which may be about fourteen inches high, and ill you come to the deepest

glass has been thoroughly
nd the colours are in their
ike out the glass hot as it is,
m a smooth marble, flatting
another similar marble, and
nto slices of equal bigness,
e thickness of an inch and

an instrument, which the
bocca di cane, you must
ieces square, and others of
es and sizes, as occasion re-
e pieces are to be orderly
ases, as in painting in fres-
l to range all the different
, and according to their co-

red to have gold, either in
the painting, or in the or-
lraperies, take some of the
s, formed and cut in the
e mentioned; moisten these
with gum-water, and after-
m over with leaf gold; then
, or several pieces at a time,
el, and place it in the mouth
, after you have first cover-
th another hollow piece of
ese stand till they are just
draw the shovel out all at
gold will become so firmly
e glass, that it will never
me off.
ister is to be laid thick on
d therefore will continue
for a considerable time,
enough prepared at once to
uch work as will take up
lays.
is composed of lime made
, with brickdust very fine,
h, and whites of eggs; and
hus prepared and laid on
l the design of what is to be
ansferred to it, take out the
glass with a pair of plyers,
m one after another, still
y to the light, shadow, dif-
d colours which are to be
pressing or flatting them
uler, which serves both to
in the ground, and to ren-
even.
and tedious labour are re-
n the work, which will be
as the pieces of glass are
, and ranged at an even

saic work performed with
ar as smooth as a table of
finished and masterly as
resco, with this advantage,
a fine lustre and will last

marble, and precious stones.

nds of mosaic bear so near
e to each other, as to the
king, that, to avoid repeti-
ive them both under one,
we proceed, wherein the
n the other, either in the
anging of the stones.
of marble is used in large
avements of churches and

palaces, and in the incrustation and veneering of the walls of edifices of the same kind.

Mosaic of precious stones is only used in small works, as ornaments for altar-pieces, tables for cabinets, &c. on account of the exceedingly high price of the materials.

Process of mosaic painting.

The ground of mosaic work wholly marble, is usually a massive marble, either white or black.

On this ground the design is cut with a chisel, after it has been first chalked.

After it has been cut of a considerable depth, i.e. an inch or more, the cavities are filled up with marble of a proper colour, (first selected according to the colours of the design, or original picture to be copied,) and reduced to the thickness of the indentures with various instruments.

To make the pieces thus inserted into the indentures cleave fast, (whose several colours are to imitate the tints of the original design,) a stucco is composed of lime and marble-dust, or a kind of mastic, which is prepared by each workman after a different manner peculiar to himself.

The figures being marked out, the painter or sculptor himself draws with a pencil the colours of the figures not determined by the ground, and in the same manner makes strokes or hatchings in the place where shadows are to be; and after he has engraven with the chisel all the strokes thus drawn, he fills them up with a black mastic, composed partly of Burgundy pitch poured on hot, taking off afterwards what is superfluous with a piece of soft stone or brick, which, together with water and beaten cement, takes away the mastic, polishes the marble, and renders the whole so even that one would imagine it only consisted of one piece.

As for mosaic work of precious stones, other and finer instruments are required than those used in marble, as drills, wheels, &c. used by lapidaries, and engravers on stone.

As none but the richest marbles and stones are used in this work to make them go the further they are sawn into the thinnest slices or coats imaginable, scarce exceeding half a line in thickness: the block to be sawn is fastened firmly with cords on the bench, and only raised a little on a piece of wood one or two inches high.

Two iron pins, which are on one side of the block, and which serve to fasten it are put into a vice contrived for the purpose; and with a kind of saw or bow, made of fine brass wire bent on a piece of spungy wood, together with emery steeped in water, the slice is gradually fashioned by following the stroke of the design made on paper and glued on the piece.

When there are pieces enough fastened to form any one entire part of the design they are applied to the ground.

The ground which supports this mosaic work is usually of free-stone.

The matter with which the stones are

Gypsum is a kind of coarse talc, or shining transparent stone, found in tl quarries of Mont-Martre, near Paris. is different from the plaister of Paris, b retains the name which the Romans gav to the plaister, viz. gypsum.

Of this gypsum, or stone calcined in kiln, and beaten in a mortar, and sifte the French have made a sort of artific marbles, imitating precious stones, an of these they compose a kind of mosai work, which does not come far short e ther of the durableness or the vivacity the natural stones; and which, beside has this advantage, that it admits of co tinued pieces or paintings of entire com partments without any visible joining.

Some make the ground of plaister Paris, others of free stone. If it is plaister of Paris, they spread it in a wood en frame, of the length and breadth the work intended, and in thickness abo an inch and a half.

This frame is so contrived that the ten ons being only joined to the mortises b single pins, they may be taken asunde and the frame be dismounted, when th plaister is dry.

The frame is covered on one side wit a strong linen cloth, nailed all roun which being placed horizontally with th linen at the bottom, is filled with plaiste passed through a wide sieve.

When the plaister is half-dry, th frame is set up perpendicularly, and le till it is quite dry, then it is taken out b taking the frame to pieces.

In this kind of mosaic the ground is the most important part.

Now, in order to the preparation o this sifted gypsum, which is to be applie on this ground, it should be dissolved an boiled in the best English glue, and mixed with the colour that it is to be of; the the whole is to be worked up together i the usual consistence of plaister, and

the greatest importance for
vation of this kind of painting
ters are purged of oil, in order
ay imbibe the colours laid on
necessary that their surface is
smooth, and is very dry and

t is next provided with a cir-
er, nearly two inches in dia-
d one-fourth of an inch in
remely thin, and painted on
with black. This circle is em-
ontain the water on the sur-
picture.
stilled from rain or snow is
to any other; ordinary wa-
ount of the salts which it con-
ng pernicious to this mode of

ours, also, must be ground be-
Oriental agates, most carefully
from dust; and mixed with
pies, or any other siccative oil,
been extracted without fire,
l as water.
olours being ground, are placed
heap, on a piece of glass co-
distilled water, in a tin box.
terials being thus prepared,
t to be painted is faintly traced
ack-lead pencil on one of the
loth above-mentioned.
s are formed on the pallet from
eaps under the water, and the
ed as usual in the left hand.
ure is held between the thumb
nger, supported by the middle,
ecessary pencils between the
little fingers. The hand rests
ck of a chair, to give a full
bringing the work near, or re-
from the eye.
ncils are cleaned with essence
d turpentine.
aving made the rough draught
colours still fresh, the circle of
hich ought to surround the pic-
ed exactly to the surface.
illed water is poured within this
it rises to the height of one
n inch, and the eye is held per-
r over the object. The third
the right hand must rest on
al right angle of the picture.
st retouches his work, adding
d softening as he finds re-

s as the oil swims on the top,
is poured off, and the picture
covered with a watch-glass,
l in a box by a gentle heat.
s is dry enough to be scraped
ooth with a knife, the artist re-
same method till he is satisfied
work.
this period that the advantage
ew method particularly shews
the purpose of finishing; as the
oured on the picture discovers
lt of the pencil, and gives the
f correcting and perfecting with
.
the work is finished, it is put
crystal, from which the external
xcluded, and it is then dried
of a gentle heat.
NG, or white copper, a me-
posed of copper, nickel, and

zinc. The zinc amounts to nearly one-half of the whole, and the proportions of copper and nickel are as 5 to 13. This compound metal is much used among the Chinese.

PALÆSTRA, in Grecian antiquity, a public building, where the youth exercised themselves in wrestling, running, playing at quoits, &c.

PALAMEDEA, a genus of birds belonging to the order of grallæ. The character of this genus is, the bill bends down at the point with a horn, or with a tuft of feathers erect near the base of it; the nostrils are oval; the toes are divided almost to their origin, with a small membrane between the bottoms of each.

PALASSIA, a genus of the syngenesia, polygamia frustranea class and order. The receptacle is chaffy; down none; seeds vertical; margin ciliated; calyx imbricate. There is one species, a shrubby plant of Lima.

PALLET, in heraldry, is nothing but a small pale.

PALLET. See *Watch*.

PALM, a measure of length, about three inches.

PALPITATION. See *Medicine*.

PALSY. See *Medicine*.

PALY, or *Pale*, in heraldry, is when the shield is divided into four or more equal parts, by perpendicular lines falling from the top to the bottom.

PALATE. See *Anatomy*.

PALATINE COUNTIES, are those of Chester, Durham, and Lancaster.

PALAVIA, a genus of the monadelphia polyandria class and order. The calyx is half five-cleft, style many-cleft; capsule many-seeded; cells in a ball on the central receptacle. There are two species, of no note.

PALE, in heraldry, one of the honourable ordinaries of an escutcheon, being the representation of a pale or stake placed upright, and comprehending the whole height of the coat from the top of the chief to the point. See *Heraldry*.

PALISADE, or *Palisado*, in fortification, an inclosure of stakes or piles driven into the ground, each six or seven inches square, and eight feet long, three whereof are hid under ground. Palisadoes are generally used to fortify the avenues of open forts, gorges, half-moons, the bottoms of ditches, the parapets of covert-ways, and in general all posts liable to surprize, and to which the access is easy. Palisadoes are usually planted perpendicularly, though some make an angle inclining towards the ground next the enemy, that the ropes cast over to tear them up may slip.

Palisades, Turning, are an invention of M. Coehorn, in order to preserve the palisades of the parapet of the covert-way from the besieger's shot. He orders them so, that as many of them as stand in the length of a rod, or in about ten feet, turn up and down like traps, so as not to be in sight of the enemy till they just bring on their attack, and yet are always ready to do the proper service of palisades.

PALISSE, in heraldry, a bearing like a range of palisades before a fortification

nc gravity varies according to i
fect fusion, and as it is more or le
rous, from hammering or flatting,
10.9 to 11.8. It is a less perfect co
tor of caloric than the other metal
is also less expansible. When ex
to a strong heat, its surface tarni
little, and becomes blue, but, by in
ing the heat, it again becomes
By a very great heat it is fused. It i
oxided by heat; its oxides form
the action of acids are reduced by n
of a high temperature. It is acted
by a number of the acids; and th
lutions formed by them may be de
posed by the alkalies and earths ;
cipitates being thrown down, whic
generally of a beautiful orange colo

PALLIUM, or *Pall*, an archiepis
vestment of white woollen cloth,
the breadth of a border, made round
thrown over the shoulders. Upon
border there are two others of the
matter and form, one of which falls
upon the breast, and the other upo
back, each having a red cross upon
several crosses of the same colour
likewise upon the upper part of it a
the shoulders. The pall was par
the imperial habit, and originally g
ed by the emperors to patriarchs ; b
present it is given by the Pope as a
of the apostolic power, without w
neither the function nor title of ar
shop can be assumed by the bishop
his communion.

PALMÆ, in botany, *Palms*. U
this name *Linnæus* has arranged sev
genera, which he has placed apart in
appendix to the work. The same pl
constitute one of the seven familie
tribes into which all vegetables are
tributed by Linnæus in his "Philoso
Botanica." They are defined to be pl
with simple stems, which, at their s
mit, bear leaves resembling those of
ferns, being a composition of a leaf

he white officinal poppy is one
arieties of this sort. It grows often
eight of five or six feet, having
owers, both single and double,
ed by capsules or heads as large as
, each containing about 8000

R, sheets of a thin matter, made
vegetable substance.
R-OFFICE, an office in which all
lic writings, matters of state and
proclamations, letters, intelli-
negotiations abroad, and gene-
dispatches that pass through the
f the secretaries of state, are lodg-
ay of library.
-*office* is also an office belonging
urt of king's bench.
R MACHE, is a substance made
gs of white or brown paper, boil-
ter, and beaten in a mortar till
reduced into a kind of paste; and
led with a solution of gum arabic
e, to give tenacity to the paste,
afterwards formed into different
, by pressing it into oiled moulds.
y, it is covered with a mixture
and lamp black, and afterwards
d.
LIO, *butterfly*, a genus of insects
order lepidoptera. The generic
r is, antennæ thickening towards
emity, commonly terminating
b or clavated tip; wings (when
rect, and meeting upwards, flight

prodigious number of species
ng to many hundreds, in this ge-
ders it absolutely necessary to
e whole into sections or sets, in-
from the habit or general appear-
and in some degree, from the
tion of the colour on the wings.
ision of the genus is conducted by
, in a peculiar elegant and in-
e manner, being an attempt to
, in some degree, natural and
tory, by attaching the memory of
ustrious antient name to an insect
tain particular cast.
STS, persons professing the po-
igion. By several statutes, if any
priest of the church of Rome,
the dominions of the crown of Eng-
ame to England from beyond the
tarried in England three days
conforming to the church, he was
f high treason; and they also in-
the guilt of high treason who were
led to the see of Rome, or procur-
rs to be reconciled to it. By these
lso, papists were disabled from
their children any education in
wn religion. If they educated
ildren at home, for maintaining
oolmaster, if he did not repair
ch, or was not allowed by the bi-
the diocese, they were liable to
10*l* a month, and the schoolmas-
e to the orfeiture of 40*s*. a
sent their children for edu-
broad, they were liable to forfeit
d the children so sent were in-
of inheriting, purchasing, or en-
ny lands, profits, goods, debts,
, or sums of money: saying mass
nishable by a forfeiture of 200,
and hearing it by a forfeiture of 100*l*.

But during the prese the Roman Catholics have been e measure relieved from many o dious and unjust restrictions for ly imposed on them. See 18 *Geo.* II c. 60: and 31 *Geo.* III. *c.* 32.

Yet as the statute 1 William and Mary, st. 1, c. 18, called the Toleration Act, does not apply to Catholics, nor to persons denying the Trinity, they cannot serve in corporations, and are liable to the test and corporation act. They cannot sit in the House of Commons, nor vote at elections, without taking the oath of supremacy and cannot present to advowsons, although Jews and Quakers may. But the person is only disabled from presenting, and still continues patron. It seems they may serve on juries, but Catholic ministers are exempted. They also are entitled to attend the British factories and their meetings abroad, and may hold offices to be wholly exercised abroad, and may also serve under the East India Company, or in the army abroad, and the 60th regiment is chiefly composed of persons who cannot serve in England, by reason of the officers.

PAPOPHORUM, a genus of the class and order triandria digynia. The calyx is two-valved, two-flowered; corolla two-valved, many-awned. There is one species, a grass of America.

PAPPUS, *down*. See *Botany*.

PAR, in commerce. See *Exchange*.

PARABOLA, in geometry, a figure arising from the section of a cone, when cut by a plane parallel to one of its sides. See *Conic Sections*.

PARABOLIC CONOID, in geometry, a solid generated by the rotation of a parabola about its axis: its solidity is = ½ of that of its circumscribing cylinder.

The circles conceived to be the elements of this figure, are in arithmetical proportion, decreasing towards the vertex.

A parabolic conoid is to a cylinder of the same base and height, as 1 to 3; and to a cone of the same base and height as 1½ to 1. See *Gauging*.

PARABOLIC *Space*, the area contained between any entire ordinate and the curve of the incumbent parabola.

The parabolic space is to the rectangle of the semi-ordinate into the abscis, as 2 to 3; to a triangle inscribed on the ordinate as a base, it is as 4 to 3.

PARABOLOIDES, a name given to parabolas of the higher kind, which are algebraic curves.

PARACENTRIC MOTION, in astronomy, denotes so much as a revolving planet approaches nearer to, or recedes from, the sun, or centre of attraction.

PARADE, in war, is a place where the troops meet to go upon guard, or any other service. In a garrison where there are two, three, or more regiments, each have their parade appointed, where they are to meet upon all occasions, especially upon any alarm. And in a camp, all parties, convoys, and detachments have a parading place appointed them at the head of some regiment.

PARADISEA, *the bird of Paradise*, in

but to
housings and harnesses of their ho
They are found only within a few
grees of the equator. Gmelin enu
rates twelve species, and Latham ei
P. apoda, or the greater Paradise b
is about as large as a thrush. Th
birds are supposed to breed in N
Guinea, whence they migrate into A
returning to North Guinea with the
monsoon. They pass in flights of th
or forty, headed by one whose flight
higher than that of the rest. They are
ten distressed by means of their l
feathers in sudden shiftings of the wi
and unable to proceed in their flig
are easily taken by the natives who a
catch them with birdlime, and shoot the
with blunted arrows. They are sold
Aroo for an iron nail each, and at Ban
for half a rix dollar. Their food is n
ascertained, and they cannot be ke
alive in confinement. The smaller bi
of Paradise is supposed by Latham to
a mere variety of the above. It is four
only in the Papuan islands, where it
caught by the natives often by the han
and exenterated and seared with a h
iron in the inside, and then put into th
hollow of a bamboo to secure its plumag
from injury.

PARADOX, in philosophy, a propos
tion seemingly absurd, as being contra
to some received opinion; but yet true i
fact.

PARAGOGE, in grammar, a figur
whereby a letter or syllable is added to th
end of a word; as *med*, for *me*; *dicier*, fo
dici, &c.

PARALLACTIC, in general, somethin
relating to the parallax of heavenly bodies
See *Parallax*.

PARALLAX, in astronomy, denotes
change of the apparent place of any hea
venly body, caused by being seen from
different points of view

There are seven species. The P. aurelia is compressed, longitudinally plaited towards the fore-part, acute behind. It is found in ditch-water and infusions; membranaceous, four times as long as it is broad, the fore-part obtuse, hyaline; the hind part filled with molecules; the gold reaching from the middle to the tip.

PARAMETER, in conic sections, a constant line, otherwise called latus rectum. See *Conic Sections*.

PARAMOUNT, the supreme or highest lord of the fee.

PARAPET, in fortification, an elevation of earth designed for covering the soldiers from the enemy's cannon, or shot.

PARAPHERNALIA, are the wo apparel, jewels, and other things, in the life-time of her husband, she as the ornaments of her person, to lowed by the discretion of the cour cording to the quality of her and her band. The husband cannot devis ornaments and jewels of his though, during his life, he has pow dispose of them. But if she continu in the use of them till his death, she afterwards retain them against his cutors and administrators, legatee all other persons, except creditors there is a deficiency of assets. 2 Black. 436.

PARAPHRASE, an explanation of some text, in clearer and more ample terms, whereby is supplied what the author might have said or thought on the subject; such are esteemed Erasmus's Paraphrase on the New Testament, the Chaldee Paraphrase on the Pentateuch, &c.

PARAPLEGIA, or *Paraplexia*, in medicine, a species of paralysis or palsy, usually succeeding an apoplexy. See *Medicine*.

PARASANG, an antient Persian measure, different at different times, and in different places; being sometimes 30, sometimes 40, and sometimes 50 stadia or furlongs.

PARASITES, or *Parasitical plants*, in botany, such plants as are produced out of the trunk or branches of other plants, from whence they receive their nourishment, and will not grow upon the ground, as the misletoe, &c.

PARCEL-MAKERS, two officers in the exchequer, who make parcels of the escheator's accounts, in which they charge them with every thing they have levied for the king's use, within the time of their office, and deliver the same to one of the auditors of the court to make their accounts therewith.

PARCHMENT, in commerce, the skin of sheep or goats prepared after such a manner as to render it proper for writing upon, covering books, &c.

religious sense, is an ivine placability towards iders. It is nearly the favour, and is conferred comply with the terms or he Gospel, which are faith, , and future obedience. It of the sovereignty of Almighty nd is therefore given without any consideration of reward, satisfaction, or advantage, to the offended.

PARDON, in a legal sense, is the remitting or forgiving a felony, or other offence committed against the king. Blackstone mentions the power of pardoning offences to be one of the greatest advantages of monarchy in general above every other form of government; and which cannot subsist in democracies. Its utility and necessity are defended by him on all those principles which do honour to him and human nature. See 4 Black. 495.

Pardons are either general or special; general as by act of parliament, of which if they are without exceptions, the court must take notice *ex officio*; but if there are exceptions therein, the party must aver that he is none of the persons excepted. 3 Inst. 233. Special pardons are either of course, as to persons convicted of manslaughter, or *se defendendo*, and by several statutes, to those who shall discover their accomplices in several felonies: or of grace, which are by the king's charter, of which the court cannot take notice *ex officio*, but they must be pleaded. 3 Inst. 233.

A pardon may be conditional, that is, the King may extend his mercy upon what terms he pleases; and may annex to his bounty a condition either precedent or subsequent, on the performance whereof, the validity of the pardon will depend and this by the common law.—2 Hawk. 37.

PAREGORICS, See *Pharmacy*.

PARANCHYMA *of plants*, that part of the plant that lies immediately below the epidermis. It is of a deep green colour, very tender and succulent.

PARENTHESIS, in grammar, certain intercalary words, inserted in a discourse, which interrupt the sense or thread, but seem necessary for the better understanding of the subject.

PARENTS AND CHILDREN. If parents run away, and leave their children at the charge of the parish, the churchwardens and overseers, by order of the justices, may seize the rents, goods, and chattels of such parents, and dispose thereof towards their children's maintenance. A parent may lawfully correct his child, being under age, in a reasonable manner; but the legal power of the father over the persons of his children, ceases at the age of 21. 1 Black. 452.

PARHELION. See *Optics*.

PARIAN CHRONICLE, See *Arundelian Marbles*.

PARIANA, a genus of the monœcia polyandria class and order. The male flowers in whorls, forming spikes; calyx two-valved; corolla two-valved, larger than the calyx; filaments 40. Female flowers solitary in each whorl; calyx two-valved; corolla two-valved; stigma two-seeded, three-cornered. There is one species, of no note.

PARIETALA OSSIA. See *Anatomy*.

PARIETARIA, *pellitory of the wall*, a genus of the monœcia order, in the polygamia class of plants, and in the natural method ranking under the 53d order, scabridæ. The calyx of the hermaphrodite is quadrifid; there is no corolla; there are ls fastened to the yards, are as to go round about the e yards, by their means, nd down upon the masts: th the breast-ropes, fasten e masts.

See *Psittacus*.

See *Apium*.

See *Pastinaca*.

ignifies the incumbent of a is in himself a body corpo- to protect and defend the hurch by a perpetual suc- en a parson is instituted and o a rectory, he is then, and n full and complete pos- eck. 391.

music, the name of each of of any harmonic com- which, when performed in its harmony. Four is the er of parts with which the sary to elaborate harmony letely filled.

, in gardening, a level divi- d, which, for the most part, h, and best front of a house; ally furnished with greens,

IUM, a genus of the pentan- the monœcia class of plants, tural method ranking under er, compositæ. The male non and pentaphyllous; the disk monopetalous. The ve florets of the radius, each le florets behind it; the female superior; the seed here are two species.

artie, *Party*, or *Parted*, in applied to a shield or es- noting it divided or mark- rtitions. See *Heraldry*.

LE, See *Grammar*.

, See *Grammar*.

n law, signify the persons d in a deed or fine, viz. de the deed, or levied the those to whom the same levied.

N, is a dividing of lands de- the common law or custom s or parceners, where there e least.

N, in music, the disposition l parts of a song set on the so as upon the uppermost es are found the treble; in tenor, &c. that they may be ayed, either jointly or sepa-

NERS, are partners interest- essed of certain shares in a ers are tenants in common her; but one or more joint- ing to contribute their quota of the vessel, cannot prevent ng to sea against the consent ity of the owners, who, giving he Admiralty, may freight the own exclusive risk, by which lissentient number of owners ded at once from any share, risk or in the profits.

. If there are several joint nd a person has dealings ith one of them in matters their joint trade, whereby nes due to the said person, it shall charge them joint the survivors of them; but if th m only scait with one of the p pon a deparate account, in that he debt shall only affect that partner and his executors. If one or more of the joint traders become bankrupt, his or their proportions are only assignable by the commissioners, to be held in common with the rest who are not bankrupts. If one of two partners become a bankrupt, the commissioners cannot meddle with the interest of the other, for it is not affected with the bankruptcy of his companion. Payment to one of the partners, is payment to them all.

PARTRIDGE. See *Tetrao*.

PARUS, or *Titmouse*, in ornithology, a genus belonging to the order of passeres. The bill is very entire, covered at the basis with hairs; the tongue is truncated and hairy. There are 14 species.

PASPALUM, a genus of the triandria digynia class and order. The calyx is two-valved, orbicular; corolla of the same size; stigma pencilled. There are 15 species, all foreign grasses.

PASQUIN, a mutilated statue at Rome, in a corner of the palace of the Ursini: it takes its name from a cobler of that city called Pasquin, famous for his sneers and gibes, and who diverted himself with passing his jokes on all the people who went through that street.

PASS, a straight, difficult, and narrow passage, which shuts up the entrance into a country. The first care of the general of an army is to seize the passes of the country into which he would carry the war, to fortify them, and take care that they are well guarded.

PASSAGE, or *Passo*, any phrase or short portion of any air, or other composition. Every member of a strain or movement is a passage.

PASSAGE, *birds of*. See *Migration*.

PASSAGIO (Italian), a succession of sounds so connected in their melody and expression, as to form a member or phrase in the composition.

PASSANT. See *Heraldry*.

PASSERINA, in botany, a genus of the octandria monogynia class of plants, the flower of which is composed of a single petal, divided into four oval segments at the limb; the fruit is a coriaceous capsule, of an oval shape, with only one cell, and containing a single oval seed. There are 19 species.

PASSIFLORA, or *Passion-flower*, a genus of the pentandria order, in the gynandria class of plants, and in the natural method ranking under the 34th order, cucurbitaceæ. The calyx is pentaphyllous; there are five petals; the nectarium a crown; the berry is pedicellated. There are 30 different species, all of them natives of warm foreign countries, only one of which is sufficiently hardy to succeed well in the open ground here; all the others requiring the shelter of a greenhouse or stove, but chiefly the latter.

PASSIONS, in painting: the passions are properly considered as subjects of painting; because being capable of representation by lines and colours, they fall within the province of that art, whose office it is to delineate all objects which can be expressed by those means. To

a passion, not always o
ture; though always
Grief, can hardly be sa
tion of self-love, though
its origin to that passi
violent and unconqu
passions; and is not
cause of settled mel
madness.

PASSPORT, or *Pass*,
ing obtained from a pr
granting liberty and s
through his territories
tion. Passport also s
obtained for importing
or for exporting and in
dise without paying the
licences are always gi
and other public minis
gage, equipage, &c.

PASTE, in the glass t
loured glass, made o
lead, and metallic pre
imitate the natural ge

PASTEBOARD. See

PASTINACA, the *P*
the digynia order, in t
of plants, and in the na
ing under the 45th
The fruit is an elli
plane; the petals are
tire. There are only t
genus, the principal of
tinaca sativa, or gard
is an exceedingly fine e

PATEE, or *Pattee*, i
small in the centre, an
extremes, which are ve

PATELLA. See *An*

PATELLA, or *Limp*
sects belonging to t
testacea. The shells
which is called unival
contour, and are in
pointed cones. They
ed to some hard body.
sometimes acute, s
flatted, turned back, or

PATENT, in genera
thing that stands ope

PAY, in the sea language. The seamen say, pay more cable, when they mean to let out more cable.

PAYING, among seamen. When the seams of a ship are laid over with a coat of hot pitch, it is called paying her; and when this is done with canvas, parcelling: also when, after she is graved, and the soil burned off, a new coat of tallow and soap, or one of train-oil, rosin, and brimstone boiled together, is put on her, that is also called paying of a ship.

PAYMENT, is the consideration or purchase-money for goods, and may be made by the buyer giving to th [illegible] he price agreed upon, either by b [illegible] e, or by money.

PEACE, in law, signifies a [illegible] t and harmless behaviour towards th [illegible] ng and his people.

PEACE, *justices of the*, are p [illegible] pointed by the king's commissi [illegible] to the peace of the county [illegible] dwell.

PEACH, botany. See *Amyga* [illegible]

PEACOCK. See *Pavo*.

PEAR, in botany. See *Pyru* [illegible]

PEARCH, in ichthyology. [illegible]

PEARL, a concretion forme [illegible] species of shells, as in some s [illegible] oyster and the muscle. It h [illegible] garded by some persons as a [illegible] d concretion, owing to an excess of [illegible] helly matter, and by others it is suppo [illegible] ed to have originated in a wound of the shell containing the animal. Pearls are of a silvery or blueish-white colour, and very brilliant. As they consist of concentric layers of carbonate of lime and membrane, alternately arranged, the refraction of light is ascribed to the lamellated structure.

PEARL, *mother of*, is the shell not of the pearl oyster, but of another sea-fish of the oyster kind. This shell on the inside is extremely smooth, and of the whiteness and water of pearl itself; and it has the same lustre on the outside, after the first laminæ or scales have been cleared off with aquafortis and the lapidary's mill.

PEAT, a well-known inflammable substance, used in many parts of the world as fuel.

PEBBLES, the name of a genus of fossils, distinguished from the flints by having a variety of colours. These are defined to be stones composed of a crystalline matter debased by earths of various kinds in the same species; and then subject to veins, clouds, and other variegations, usually formed by incrustation round a central nucleus, but sometimes the effect of a simple concretion; and veined like the agates, by the disposition which the motion of the fluid they were formed in gave their differently [illegible] ances.

[illegible], in zoology, the fifth order [illegible] s mammalia, in the Linnæan [illegible]

[illegible], the *scallop*; a genus of shell- [illegible] aracters of which are these: [illegible] is a tethys: the shell bivalve [illegible] il; the hinge toothless, having [illegible] ovated hollow.

[illegible] a genus of the class and order [illegible] polygamia superflua. The cal. is five-leaved, cylindric; florets in the ray five; down awned; recept. naked.

PECULIAR, in the canon law, signifies a particular parish or church that has jurisdiction within itself for granting probates of wills, and administrations, exempt from the ordinary or bishop's courts.

PEDALS. See *Organ*.

PEDALIUM, a genus of the class and order didynamia angiospermia. The cal. is five-parted; the cor. five-cleft; nect. subaceous; seeds two.

PEDESTAL. See *Architecture*.

PEDICELLARIA, a genus of insects of the order vermes mollusca: the generic character is, body soft and seated on a rigid peduncle; aperture single.

PEDICULARIS, *red-rattle, or louse-wort*, a genus of the didynamia angiospermia class of plants, the corolla whereof consists of a single ringent petal; the tube is oblong and gibbous; the upper lip ga leated, erect, compressed, and emargi nated; the under one is patent, plane semitrifid, and obtuse; the fruit is a roundish acuminated capsule; the seed are numerous, roundish, compresse and covered. There are 19 species.

PEDICULUS, louse, a genus of insect of the order aptera: the generic characte is, legs six, formed for walking; mout furnished with an exsertile piercer antennæ the length of the thorax; ab domen depressed, sublobated.

PEDIGREE. See *Descent*.

PEDIMENT. See *Architecture*.

PEDOMETER, or *Podometer*, foot-mes surer, or way-wiser; a mechanical instru ment, in form of a watch, and consisting various wheels and teeth; which, b means of a chain, or string, fastened to man's foot, or to the wheel of a chario advance a notch each step, or each revo lution of the wheel; by which it num bers the paces or revolutions, and the distance from one place to an ther. See *Perambulator*.

PEEK, in the sea-language, is a wo used in various senses. Thus the anch is said to be a peek, when the ship bei about to weigh, comes over her anchor such a manner that the cable han perpendicularly between the hawse a the anchor. To heave a peek, is to bri the peek so that the anchor may hang peek. A ship is said to ride a pe when lying with her main and fore-yar hoisted up, one end of her yards is brou down to the shrouds, and the other rais up on end; which is chiefly done wh she lies in rivers, lest other ships fall foul of the yards should break the Riding a broad peek denotes much same, excepting that the yards are o raised to half the height.

PEERS, in our common law, are th who are impannelled in an inquest up any man, for the convicting or clear him of any offence, for which he is call in question; and the reason is, beca the course and custom of our nation is, try every man in such a case by his equ or peers.

PEERS *of the realm*, are the nobility the kingdom, and lords of parliame who are divided into dukes, marquises, earls, viscounts, and barons; and the reason why they are called peers is, because, notwithstanding there is a distinction of dignities in our nobility, yet in all public actions they are equal, as in their votes of parliament, and in passing upon the trial of any nobleman.

PEERESS, a woman who is noble by descent, creation, or marriage.

PEGANUM, *wild-rue* or *harmel*, a genus of the dodecandria monogynia class of plants, the flower of which consists of five oval petals; and its fruit is a trilocular capsule containing a great many small seeds. There are two species.

PEGASUS, a constellation of the northern hemisphere, in form of a flying horse, said by different authors to contain 19, 20, and 93 stars.

PEGASUS, is also a genus of fishes of the order nantes.

PELAGIANS, a Christian sect who appeared before the latter part of the fourth, or the beginning of the fifth century. They are said to have maintained, 1. That Adam was by nature mortal, and whether he had sinned or not, would certainly have died. 2. That the consequences of Adam's sin were confined to his own person. 3. That new-born infants are in the same condition with Adam before the fall. 4. That the law qualified men for the kingdom of heaven, and was founded upon equal promises with the gospel. 5. That the general resurrection of the dead does not follow in virtue of our Saviour's resurrection. 6. That the grace of God is given according to our merits. 7. That this grace is not granted for the performance of every moral act: the liberty of the will, and information in points of duty, being sufficient, &c.

PELICAN, in chemistry, a kind of double glass vessel, used in distilling liquors by circulation: it consists of a cucurbit and alembic head, with two tubes bending into the cucurbit again.

PELICANUS, in ornithology, a genus belonging to the order of anseres. The bill is straight, without teeth, and crooked at the point; the face is naked, and the feet are palmated.

PELLICLE, among physicians, &c. denotes a thin film, or fragment of a membrane.

PELTARIA, a genus of the siliculosa order, in the tetradynamia class of plants, and in the natural method ranking under the 39th order, siliquosæ. The silicula is entire, and nearly orbiculated, compressed plane, and not opening.

PELVIS, in anatomy, the lower part of the cavity of the abdomen.

PEN, *fountain*, is a pen made of silver, brass, &c. contrived to contain a considerable quantity of ink, and let it flow out by gentle degrees, so as to supply the writer a long time without being under the necessity of taking fresh ink.

PENANCE, in our canon law, is an ecclesiastical punishment, chiefly adjudged to the sin of fornication.

PENÆA, a plant of the tetrandria monogynia class, with a monopetalous campaniform flower; and a quadragonal capsule for its fruit, containing four cells, with two oblong seeds in each. There are nine species.

PENDANT, an ornament hanging at the ear, frequently consisting of diamonds, pearls, and other precious stones.

PENDANTS, in heraldry, parts hanging down from the label, to the number of three, four, five, or six at most, resembling the drops in the Doric frieze.

PENDANTS of a ship, are those streamers or long colours which are split and divided into two parts ending in points, and hang at the head of masts, or at the yard-arm ends.

PENDULUM, in mechanics, any heavy body, so suspended as that it may swing backwards and forwards, about some fixed point, by the force of gravity.

PENDULUM, *simple*, in mechanics, an expression commonly used among artists, to distinguish such pendulums as have no provision for correcting the effects of heat and cold, from those that have such provision.

PENDULUM, *compound*, in mechanics, is a pendulum whose rod is composed of two or more wires or bars of metal. These, by undergoing different degrees of expansion and contraction, when exposed to the same heat or cold, have the difference of expansion or contraction made to act in such a manner as to preserve constantly the same distance between the point of suspension and centre of oscillation, although exposed to very different and various degrees of heat or cold.

PENDULUM-*clock*, is a clock having its motion regulated by the vibration of a pendulum.

PENDULUM, *royal*, a name used among us for a clock, whose pendulum swings seconds, and goes eight days without winding up; shewing the hour, minute, and second.

PENEA, in botany, a genus of the monogynia order, in the tetrandria class of plants; and in the natural method ranking with those of which the order is doubtful. The calyx is diphyllous; the corolla campanulated; the style quadrangular; the capsule tetragonal, quadrilocular, and octospermous.

PENELOPE, a genus of birds of the order of gallinæ. The characters of which are: the beak is bare at the base; the head is covered with feathers: the neck is quite bare; the tail consists of twelve principal feathers; and the feet are for the most part bare.

PENGUIN, in ornithology. See *Alca*.

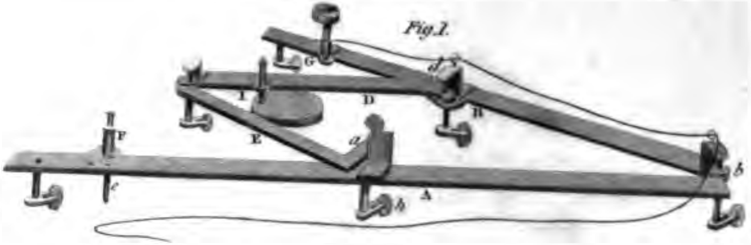
PENNANTIC, a genus of the polygamia diœcia class and order. There is no calyx; the corolla is five-petalled; stamina five: perianthum three-sided, two-celled.

PENNATULA, or *Sea-pen*, a genus of zoophyte, which, though it swims about freely in the sea, approaches near to the gorgonia. This genus has a bone along the middle of the inside, which is its chief support; and this bone receives the supply of its osseous matter by the same polype-mouths that furnishes it with nourishment. Linnæus reckons seven species.

PENNY, formerly a silver, but now a copper coin.

PENTAGRAPH.

Fig. 1.



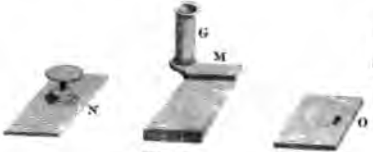
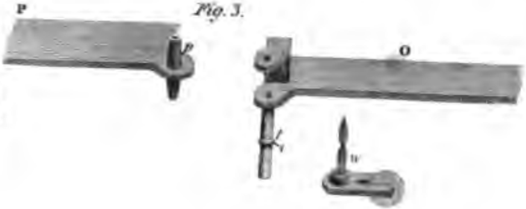


Fig. 2.

Fig. 3.



PERAMBULATOR.

Fig. 1.

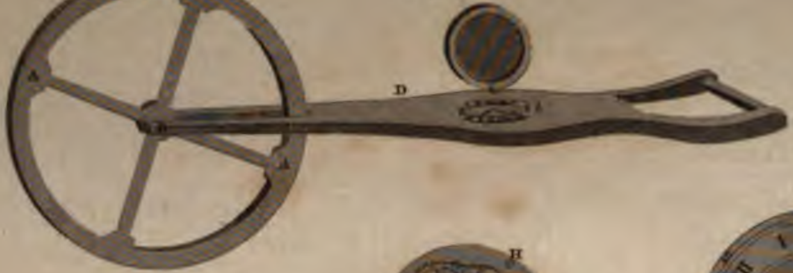
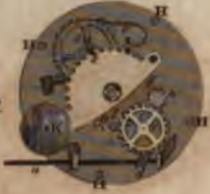


Fig. 2.



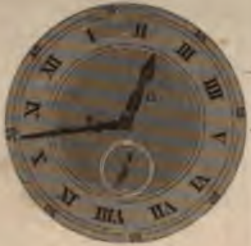


Fig. 3.

Cooper sculp.

PENNY-WEIGHT, a troy weight, being the 20th part of an ounce, containing 24 grains; each grain weighing a grain of wheat gathered out of the middle of the ear, well dried.

PENTAGON, in geometry, a figure of five sides and five angles.

PENTAGRAPH, or *parallelogram*, an instrument whereby designs of any kind may be copied in what proportion you please, without being skilled in drawing.

A pentagraph is composed of 4 bars, ABDE, plate Pentagraph, fig. 1. usually of brass; the bar A is jointed to B at *b* about the middle, and at *a* it is connected with E; the bar B is the same length as A; and at *d* is jointed to the bar D, whose end is connected with the end of E; these four bars form a parallelogram; thus, *ba* = D, and *bd* = E. To the other end of the bar A, a tube F is soldered, through which a pointed brass rod *e*, called the tracer, is put; the end of the bar B has a slider G upon it, which has a tube similar to F; another slider I of the same kind is mounted on the bar D. These sliders have screws, by which they can be fixed at any distance. Under each of the joints of the base, a small tube is fixed, in the bottom of which is a small castor as H, which makes the instrument run easily on the table. When the instrument is used, the two sliders GI must be set exactly in a line with the tube F; when it is required to make a copy of a drawing of the same size, the sliders must be set so that from F to I is the same distance as from I to G; the tube I must then have a wire put through it, whose lowest end is fast screwed to a heavy leaden weight, L, this must have three sharp points in the under side, so that when it is set on the table it may not be liable to move; then if a design or drawing is laid under the tube F, and the point of the tracer drawn over the lines of it, the point of the pencil at G will describe a similar figure. If the drawing is to be reduced to one-half of the size, the weight must be put to the slider G, and the pencil into I, without moving either slider; then the distance from the tracer to the fixed point or weight L, is twice the distance of the pencil to the weight. The rule for setting the sliders for any proportion is, as the distance between the tracer *e* and the fixed point L, is to the distance between the pencil G and the same, so is the length of any line described by the tracer, to the length of the line at the same time described by the pencil. To avoid the trouble of measuring these distances each time, the bars B and D are divided into ten or twenty of the most common proportions, by which divisions the sliders are to be fixed.

The construction of one of the sliders is shewn in fig. 2: where M is a piece of brass, to one corner of which a tube *t* is soldered; an opening of the same width as the bar is cut in this, and a cover N is screwed on with two screws; this cover has a screw with a mill-head through it, by which the slider is fixed. A piece of brass O, a little bent, is put between the bar and the under side of the cover, and whose elasticity prevents the slider moving too freely when the screw is slack, and defends the bar from being scratched by the ends of the screw when it is fixed.

Fig. 3, describes the method of making the joints of the rods: P is the end of one bar, which has a steel spindle *p* screwed fast to it; the other bar *o* has a cock *v*, screwed on, whose upper end projects over the tube *t*, and has a hole through it, just over the hole in the tube. The ends of the spindle P are put between the holes in the cock and the hole in the tube; if the spindles are well fitted, this joint is very steady, and without any shake. The lower end of the tube *t* has a hole drilled in it, into which the spindle W of the castor is put; the castor is kept from falling out of the tube, by the point of a small screw going through the side of the tube *t*, which takes into a notch cut round in the top of the spindle *w*. When the machine is used a fine line RR, is put through rings in the cocks *bd*, and tied to the pencil; the other end has a loop to be hooked over the thumb of the operator, by pulling which he can raise the pencil at D, when he does not wish it to mark.

PENTAMETER, in antient poetry, a kind of verse consisting of five feet, or metres, whence the name.

PENTANDRIA, in botany, one of Linnæus's class of plants, the fifth in order; the characters of which are, that all the plants comprehended in it have hermaphrodite flowers, with five stamina or male parts in each; they are subdivided into orders, which are denominated monogynia, digynia, trigynia, &c. according as there are one, two, or three, &c. pistils, or female parts, in each flower.

PENTAPETES, a genus of the dodecandria order, in the monadelphia class of plants, and in the natural method ranking under the 37th order, columniferæ.

PENTHORUM, a genus of the pentagynia order, in the pentandria class of plants. The calyx is quinquefid; there are either five petals or none; the capsule is five-pointed and quinquelocular. There is one species.

PENTSLEMON, a genus of the didynamia angiospermia class and order. The calyx is five-leaved; the corolla bilabiate, ventricose; rudiment of a fifth stamen, bearded above; capsules two-celled. There are two species.

PENUMBRA, in astronomy, a partial shade observed between the perfect shadow and the full light in an eclipse.

PEPLIS, a genus of the monogynia order, in the hexandria class of plants, and in the natural method ranking under the 17th order, calycanthemæ. The perianthium is campanulated; the mouth cleft in 12 parts; there are six petals inserted into the calyx; the capsule is bilocular. There are 2 species, creeping plants.

PEPPER. See *Piper*.

PERAMBULATOR, in surveying, an instrument for measuring distances, called also pedometer, way-wiser, and surveying wheel.

Plate Perambulator, figs. 1, 2, and 3, represent a perambulator; AA, fig. 1 is a wheel of mahogany, tired with iron, and made very strong; its circumference, must be exactly ninety-nine inches, or half a pole. This is placed so as to turn round in an opening cut in the piece BD, which forms the frame. In the arm B a groove is cut from the centre of the wheel to the dial *b*; the end of the spindle comes through the wood into this groove, and has a small crown-wheel of eight teeth upon it. This works another wheel of eight teeth fixed on a long spindle, which conveys motion from the wheel beneath to the dial *b*. The groove containing this spindle has a slip of wood screwed over it, to keep out dirt, &c.; and the end of this spindle has a square hole in it, into which is put the square end of the spindle *a* (fig. 2). This has an endless screw *d* upon it, which works a worm-wheel *e* of twenty-four teeth, having a pinion of twelve beneath it: and below this has a wheel *f* of thirty-six. The pinion works the wheel *g* of forty; and the wheel *f* turns the pinion *h* of twelve, whose spindle carries the short hand of the dial (fig. 3). The arbour of the wheel *g* comes up through the dial, and has the hand F (fig. 3) on it; as also a pinion of eight, which turns *g* of sixty-four. In the arbor of the wheel *h*, is a pinion of six, taking into *k* of seventy-two; this is here supposed to be half broken away, to shew the wheels beneath. The spindle of this is hollow, and is put over the arbor of the wheel *g*; and carries the hand G (fig. 3.) HHHH are four pillars, by which the two plates forming the frame for the wheels are held together. The wheel *g* (fig. 2) is not fixed fast to its spindle, but is held between a brass plate *l* and another beneath, the friction of these causes the wheel to turn the hand, and at the same time leaves the hand at liberty to be set without moving the wheels. The plate *l* has a pin *n* fixed in it; which pin takes against a projecting part of the handle of the hammer *m*, so as to lift it up when the plate is turned, and let the spring *p* through *w* against the bell K.

When any distance is to be measured by this machine, the operator takes hold of the handle, and wheels it along in as straight a line as he can. The circumference of the wheel being ninety-nine inches (or half a pole), and the two wheels in the piece being equal, the screw, *d* (fig. 2) will turn once in each turn of the great wheel, or twice for every pole the machine is wheeled. This screw must be so cut that the great wheel must turn twenty-four times for one turn of the wheel *e*, and also the wheel *f* on the same spindle as this must turn a pinion *h* of one-third of its number of teeth. The short hand on the dial which it carries will for every revolution require eight turns of the great wheel, = four poles, = one chain. The circle is divided into 100 parts each = one link. The pinion of twelve on the arbor of the wheel *e*, turning once for twenty-four turns of the great wheel, makes the wheel *g* require for each revolution eight turns of the great wheel, or for the machine to be wheeled ten chains (or turns of the short hand) = 40 poles (as the circle of its hand is divided), = one furlong: and at each revolution of this wheel the hammer *m* will strike the bell K. The pinion of eight on the arbor of the wheel *g*, work *h* of sixty-four; and its pinion *i* turns K of seventy-two, the result of which will be, that the hand on the spindle of *k* will require for each revolution 7680 turns of the great wheel, or for the machine to be wheeled 3840 poles, = 960 chains or turns of the short hand, = 96 furlongs or turns of the hand F and strokes on the bell, = twelve miles as the dial is divided.

PERCA, *Perch*, a genus of fishes of the order thoracici; the generic character is, teeth sharp, incurvate; gill-covers triphyllous, scaly, serrated; dorsal fin spiny on the fore part; scales (in most species) hard and rough.

PERCUSSION, the impression a body makes in falling or striking upon another, or the shock of two bodies in motion.

Percussion is either direct or oblique; direct, when the impulse is given in a line perpendicular to the point of contact; and oblique, when it is given in a line oblique to the point of contact.

PERDICIUM, a genus of the class and order syngenesia polygamia superflua. The corollets are bilabiate; down simple; receptacle naked. There are six species.

PERENNIAL, in botany, is applied to those plants whose roots will abide many years, whether they retain their leaves in winter or not; those which retain their leaves are called evergreens; but such as cast their leaves, are called deciduous.

PERGALESIA, a genus of the pentandria digynia class and order. Contorted nect. surrounding the genitals with five sagittated cups; corolla salver-shaped. There are five species.

PERIANTHIUM. See *Botany*.

PERICARDIUM. See *Anatomy*.

PERICARPIUM, among botanists, a covering or case for the seeds of plants. See *Botany*.

PERICRANIUM. See *Anatomy*.

PERIGÆUM, *Perigee*. See *Astronomy*.

PERIHELIUM. See *Astronomy*.

PERILLA, a genus of the class and order didynamia gymnospermia. The calyx uppermost; segment very short; stamina distant; styles two, connected.

PERIMETER, in geometry, the bounds or limits of any figure or body.

PERINÆUM, or *Perinæum*. See *Anatomy*.

PERIOD, in astronomy, the time taken up by a star or planet in making a revolution round the sun; or the duration of its course till it returns to the same point of its orbit.

PERIOD. See *Chronology*.

PERIOD, in grammar, denotes a small compass of discourse, containing a perfect sentence, and distinguished at the end by a point, or full stop, thus (.); and its members or divisions marked by commas, colons, &c.

PERIŒCI. See *Geography*.

PERIOSTEUM. See *Anatomy*.

PERIPHERY, in geometry; the circumference of a circle, ellipsis, or any other regular curvilinear figure. See *Circle*, &c.

PERIPLOCA, *Virginian silk*, a genus of the digynia order, in the pentandria class of plants; and in the natural method ranking under the 30th order, contorta. The nectarium surrounds the genitals, and sends out five filaments. There are 13 species.

PERIPNEUMONY. See *Medicine.*

PERIPTERE. See *Architecture.*

PERISCII. See *Geography.*

PERISTALTIC. See *Physiology.*

PERISTYLE. See *Architecture.*

PERITONÆUM. See *Anatomy.*

PERITROCHIUM. See *Mechanics.*

PERJURY, is a crime committed when a lawful oath is administered, by any one who has authority, to a person in any judicial proceeding, who swears wilfully, absolutely, and falsely, in a matter material to the issue or cause in question, by his own act, or by the subornation of others.

PERIWINKLE. See *Turbo.*

PERMUTATION *of quantities,* in algebra. See *Combination.*

PERORATION. See *Rhetoric*

PEROTIS, a genus of the digy rder, in the triandria class of plants, the natural method ranking under t urth order, gramina. There is no c corolla consists of a bivalvular the valves are oblong, acute, unequal, and terminating in a beard. There are two species.

PEROXIDE, in chemistry, den ie maximum of oxidizement. See O

PERPENDICULAR. See *Geom*

PERPENDICULAR *to a par* is a right line cutting the parabola in t in which any other right line , and is also itself perpendicula t tangent.

PERPETUITY, in annuities, number of years purchase to be n for an annuity which is to continue ever.

PERPETUITY is where if all t have interest join in the conveyance, yet they cannot bar or pass the estate: for, if by concurrence of all having interest, the estate may be barred, it is no perpetuity. 1 Chan. Ca. 213.

PERRON. See *Architecture.*

PERRY, a drink made of pears, in the same manner as cyder is made from apples.

PERSECUTION, is any pain or affliction which a person designedly inflicts upon another; and in a more restrained sense, the sufferings of Christians on account of their religion.

PERSEUS, in astronomy, a constellation of the northern hemisphere, which, according to the catalogues of Ptolemy and Tycho, contains twenty-nine stars; but in the Britannic catalogue sixty-seven.

PERSIAN WHEEL, an engine, or wheel turned by a rivulet, or other stream of water, and fitted with open boxes at its cogs, to raise water for the overflowing of lands or other purposes.

PERSICARIA, *arsmart.* See *Polygonum.*

PERSON, in grammar, a term applied s or pronouns, as either pre- rstood, are the nominatives ons of a verb; or it is the nt in all finite and personal

NATE, is the representing a y a fictitious or assumed character, so as to pass for the person represented.

PERSOONIA, a genus of the class and order tetrandria monogynia. There is no calyx; petals four; glands four, at the base of the germ; stigma blunt; drupe one-seeded.

PERSPECTIVE, is the art of drawing the picture or representation of any visible object on a plane surface, in such manner as it would appear on some transparent surface, interposed between an object and the eye of an observer.

PERSPIRATION, The evacuation of the juices of the body through the pores of the skin.

PERULA, a genus of the class and order dioecia polyandria.

PETAL, among botanists, an appellation given to the flower-leaves, in opposition to the folia, or common leaves of the plant.

PETALOMA, a genus of the decandria monogynia class and order; the calyx is goblet shaped, five toothed; petals five stamina on margin of calyx; berry one-celled, seeds one or four.

PETARD, in the art of war, a metalline engine, somewhat resembling a high crowned hat. Its use is in a clandestine attack to break down gates, bridges, barriers, &c. to which it is hung; and this it does by means of the wooden plank. It is also used in countermines to break through the enemy's galleries, and give their mines vent.

PETECHIÆ. See *Medicine.*

PETER-PENCE. An antient tax of a penny on each house, paid to the pope.

PETESIA, a genus of the tetrandria monogynia class and order: the corolla is one-petalled, funnel-form, stigma bifid, berry many-seeded.

PETIOLE, in botany, the slender stalk that supports the leaves of a plant.

PETITIA, a genus of the class and order tetrandria monogynia: the calyx is four-toothed, inferior; corolla four-parted drupe with a two-celled nut.

PETITIO PRINCIPII, in logic, the taking a thing for true, and drawing conclusions from it as such, when it is really false, or at least wants to be proved, before any inferences can be deduced from it.

PETITION. No petition to the king, or to either house of parliament, for any alteration in church or state, shall be signed by above twenty persons, unless the matter thereof is approved by three justices of the peace, or the major part of the grand jury in the country; and in London by the lord mayor, aldermen, and common council: nor shall any petition be presented by more than ten persons at a time.

PETIVERIA, a genus of the tetragynia order, in the hexandria class of plants, and in the natural method ranking under the 12th order, holoraceæ. The calyx is tetraphyllous; there is no corolla; and but one seed, with reflexed awns at the top.

PETREA, in botany, a genus of the didynamia angiospermia class of plants, with a monopetalous flower; divided into five rounded segments at the limb.

two substances whereof the po
China-ware is made.

PEWTER, a factitious metal,
making domestic utensils, as pla
&c. See *Zinc*.

PEZIZA, cup-mushroom, a ge
natural order of fungi, in the cr
class of plants. The fungus
nulated and sessile. Linnæus cr
11 species; Dr. Withering, 40 B
cies.

PHACA, a genus of the dec
der, in the diadelphia class o
and in the natural method rank
the 32d order, papilionaceæ.
men is semibilocular. There are

PHÆTHUSA, a genus of the
order syngenesia polygamia
The calyx is subcylindric, man
florets hermaphrodite; recept
seeds vispid. There is one spec
of Virginia.

PHAETON, in ornithology, a
birds belonging to the order o
the characters of which are:
sharp, straight, and pointed, t
are oblong, and the hinder toe
forward. There are two specie

PHALENA, *moth*, a genus
of the order lepidoptera: th
character is; antennæ setace
dually lessening from base to ti
(when sitting) generally def
nocturnal). This genus, like th
lio, containing a vast number
is divided into assortments, ac
the different habits of the anir

PHALANGIUM, a genus
of the order aptera. The gener
ter is, legs eight; eyes two ve
two lateral; front furnished w
form antennæ; abdomen gene
ded.

PHALANGIUM. See *Antheri*

PHALANX, in Grecian a

ıs whereof is papilionaceous,
ım is cordated, obtuse, emar-
nd reclined with reflex sides;
e roundish, of the same length
exillum, and stand upon long
the carina is narrow, and re-
rally in a contrary direction to
he fruit is a long, straight, co-
and obtuse pod; the seeds are
mpressed, and kidney-shaped.
21 species.

S. See *Astronomy*.

ANUS, in ornithology, a genus
to the order of gallinæ. The
covered with a smooth naked
esianus is derived from the
is, the banks of which are the
itation of the pheasant. The
e.
allus, or common cock and hen,
mpressed caruncle, or fleshy
he top of the head, and two
or wattles under the chin.
pecies Mr. Latham enumerates
n 13 permanent varieties.
otmot, or Guinea pheasant, is
somewhat red below, with a
tail, and wants spurs. 3. The
s red, with a blue head, a
ped tail, papillous cheeks.
tive of Africa and Asia. 4.
is yellowish, with black spots,
and a blue crest on the back
e head. It is found in Chi-
ary. 5. The pictus has a yellow-
a red breast, and a wedge-
l. It is a native of China.
ham enumerates nine different
pheasants, and of the common
e reckons six varieties.

A, a genus of insects of the or-
tera; the generic character is,
; antennæ filiform; eyes small,
stemmata three, between the
ngs four, membranaceous, the
r abbreviated, the lower pleat-
rmed for walking.

NT. See *Phasianus*.

ANDRIUM, *water-hemlock*, a
e digynia order, in the pentan-
of plants. The florets of the
smaller; fruit ovate, even
with the perianthium and pistil-
ere are two species, one of
t. the aquaticum, is a native of

DELPHIUS, the *pipe-tree*, or
e, a genus of the monogynia or-
the icosandria class of plants.
4 species.

REA, *mock privet*, a genus of
ynia order, in the diandria class
Each flower contains two males
male. There are three species,
shrubby plants, and natives of
Italy.

LOGY, a science, or rather as-
of several sciences, consisting of
rhetoric, poetry, antiquities,
d criticism.

SOPHY. The love of wisdom.
rally distinguished into expe-
natural, and moral, all of
treated on under their respec-
s.

DRUM, a genus of the class and
andria monogynia. The spathe is one-flowered; perianthium none; corolla four-petalled, irregular; capsule three-celled, many-seeded. There is one species, a herb of China.

PHLEBOTOMY. See *Surgery*.

PHLEUM, *cat's tail grass*, a genus of the triandria digynia class of plants, the corolla of which consists of two valves; and the seed, which is single, is included within the calyx and corolla. There are four species.

PHLOAS, a genus of vermes testacea; the animal an ascidia; shell bivalve, divaricate, with several lesser differently shaped accessory ones at the hinge; hinges recurved, united by a cartilage; in the inside, beneath the hinge, is an incurved tooth. The inhabitants of this genus perforate clay, spongy stones and wood, while in the younger state, and as they increase in size, enlarge their habitation within, and thus become imprisoned. They contain a phosphorus liquor of great brilliancy in the dark, and which illuminates whatever it touches, or happens to fall upon. There are 12 species.

PHLOMIS, the *sage-tree*, or *Jerusalem sage*, a genus of the gymnospermia order, in the didynamia class of plants. The calyx is angular; corolla, upper lip incumbent, compressed, villose. There are 22 species, all of which have perennial roots, and of many the stalks also are perennial.

PHLOX, *lychnidea*, or *bastard lychnis*, a genus of the monogynia order in the pentandria class of plants. The corolla is salver-shaped; filam. unequal; stigma trifid; calyx prismatical; capsules three-celled, one-seeded. There are 12 species all but one natives of North America.

PHOCA, *seal*, a genus of quadrupeds of the order feræ. The generic character is, fore-teeth in the upper jaw six, pointed, parallel, the exterior larger; in the lower jaw four, bluntish, parallel, distinct, equal canine teeth one on each side in both jaws, large, pointed; the upper ones distinct from the cutting-teeth, the lower from the grinders; grinders five on each side above, six below, obtusely tricuspidated. There are about 19 species.

PHŒNICOPTERUS, or *Flamingo*, in ornithology, a genus of birds belonging to the order of grallæ. The beak is naked, teethed, and bent, as if it was broken; the nostrils are linear; the feet are palmated, and four-toed. There is but one species, viz. the bahamensis of Catesby, a native of Africa and America.

PHŒNIX, in astronomy, one of the constellations of the southern hemisphere, unknown to the ancients, and invisible in our northern parts.

PHŒNIX, the *great palm* or *datetree*, a genus of plants belonging to the order palmæ. The calyx is 3-parted; corolla 3-petalled; male stamina three; female pist. one, drupe ovate. There is only one species, viz. the dactylifera, or common date-tree, a native of Africa and the Eastern countries, where it grows to 50, 60, and 100 feet high.

PHORMIUM, *flax-plant*, a genus of the class and order hexandria monogynia. There is no calyx; the corolla is six-petalled, three inner larger; capsule oblong, three-sided; seeds oblong, compressed. Of this plant there is one species: the leaves resemble those of flags; the flowers are in one variety yellow, and in the other a deep red.

PHOSPHATS, salts formed by the phosphoric acid, with the alkalies, earths, and metallic oxides. They may be distinguished by the following properties: (1.) When heated with combustibles, they are not decomposed, nor is phosphorus obtained. (2.) Before the blowpipe they are converted into a globule of glass, which in some cases is transparent, in others opaque. (3.) Soluble in nitric acid without effervescence, and precipitated from that solution by lime-water. (4.) Decomposed, at least partially, by sulphuric acid; and their acid, which is separated, when mixed with charcoal and heated to redness, yields phosphorus. (5.) After being strongly heated, they often phosphoresce.

The phosphats readily combine with an excess of acid, and form superphosphats.

The phosphats at present known amount to 17; two of which are triple salts.

PHOSPHITES, salts formed with the phosphorus acid united to the earths, alkalies, and metallic oxides. These salts may be distinguished by the following properties: 1. When heated they emit a phosphorescent flame. 2. When distilled in a strong heat, they give out a little phosphorus, and are converted into phosphats. 3. They detonate when heated with nitrat or oxymuriat of potass, and are converted into phosphats. 4. They may be converted into phosphats by nitric and oxymuriatic acid. 5. They are fusible in a violent heat into glass.

The phosphites at present known amount to eight.

PHOSPHORIC ACID. Phosphorus forms an acid with two different proportions of oxygen: combined with the largest portion of oxygen, it constitutes phosphoric acid, and with the smaller it constitutes phosphorous acid.

It may be formed by setting fire to a quantity of phosphorus contained in a vessel filled with oxygen gas The phosphorus burns with great rapidity, and a great number of white flakes are deposited, which are phosphoric acid in a state of purity. It may be obtained too by heating phosphorus under water till it melts, and then causing a stream of oxygen gas to pass through it by means of a tube. In this case the acid as it forms combines with the water; but the liquid may be evaporated off by the application of heat, and then the acid remains behind in a state of purity. But the usual method of procuring it is, to throw phosphorus in small pieces at a time into hot nitric acid. A violent effervescence takes place, the phosphorus combines with oxygen, and nitrous gas is emitted. After the whole of the phosphorus is acidified, the liquid is to be evaporated to dryness, in order to drive off the remains of nitric acid which may not have been decomposed. This process was put in practice by Lavoisier. Care must be taken not to apply too much heat, nor to add too much phosphorus at once, and not to have the nitric acid too strong; otherwise the phosphorus takes fire, and usually breaks the vessels in pieces.

The acid, thus prepared, may be put into a platinum crucible, and heated to redness to drive off all the water. It is then in a state of purity. It is solid, colourless, and transparent, and not unlike glass in appearance. It reddens vegetable blues: it has no smell: its taste is very acid, but it does not destroy the texture of organic bodies.

Phosphorous acid is prepared by exposing phosphorus during some weeks to the ordinary temperature of the atmosphere. Even in winter the phosphorus undergoes a slow combustion, and is gradually changed into a liquid acid. For this purpose, it is usual to put small pieces of phosphorus on the inclined side of a glass funnel, through which the liquor which is formed drops into the bottle placed to receive it. From one ounce of phosphorus about three ounces of acid liquid may be thus prepared.

PHOSPHORUS, in chemistry, a combustible substance remarkable for its strong attraction for oxygen, and which consequently spontaneously inflames in the open air at a moderate temperature.

Phosphorus may be procured by the following process: Let a quantity of bones be burnt, or, as it is termed in chemistry, calcined, till they cease to smoke, or to give out any odour, and let them afterwards be reduced to a fine powder. Put 100 parts of this powder into a bason of porcelain or stone ware, dilute it with four times its weight of water, and then add gradually (stirring the mixture after every addition) 40 parts of sulphuric acid. The mixture becomes hot, and a vast number of air-bubbles are extricated. Leave the mixture in this state for 24 hours; taking care to stir it well every now and then with a glass or porcelain rod, to enable the acid to act upon the powder.

The whole is now to be poured on a filtre of cloth; the liquid which runs through the filtre is to be received in a porcelain bason; and the white powder which remains on the filtre, after pure water has been poured on it repeatedly, and allowed to strain into the porcelain bason below, being of no use, may be thrown away.

Into the liquid contained in the porcelain bason, which has a very acid taste, sugar of lead, dissolved in water, is to be poured slowly; a white powder immediately falls to the bottom; the sugar of lead must be added as long as any of this powder continues to be formed. Throw the whole upon a filtre. The white powder which remains upon the filtre is to be well washed, allowed to dry, and then mixed with about one-sixth of its weight of charcoal-powder. This mixture is to be put into an earthenware retort. The retort is to be put into a sand-bath, and the beak of it plunged into a vessel of water, so as to be just under the surface. Heat is now to be applied gradually till the retort is made red-hot. A vast number of air-bubbles issue from the beak of the re-ort, some of which take fire when they come to the surface of the water. At last there drops out a substance which has the appearance of melted wax, and which congeals under the water. This substance is phosphorus.

PHOSPHURETS, substances formed by the union of the alkalies, earths, and metallic oxides, with phosphorus. Thus we have phosphuret of lime, &c.

PHOSPHURET *of Antimony*. When equal parts of antimony and phosphoric glass are mixed together with a little charcoal powder, and melted in a crucible, phosphuret of antimony is produced.

PHOSPHURET *of Barytes* may be formed by putting a mixture of phosphorus and barytes into a glass tube close at one end, and heating the mixture by putting the tube upon burning coals. These instances will be sufficient to explain the nature of phosphurets in general.

PHOTINIANS, a sect of Christ[illegible] n the fourth century, so called from [illegible] i-nus, their chief, who was bishop [illegible] mich, and maintained that Jesus [illegible] was true man, but not true God, n[illegible] before all ages; and that he onl[illegible] to be Christ when the Holy Spirit d[illegible]cended upon him in the river Jordan.

PHOTOMETER, *Measurer of light*, in a cloudy or bright day, or between two different luminous bodies. A good instrument of this kind is still a desideratum in philosophy.

PHRASE, in grammar, a manner of speech peculiarly adapted to certain occasions, arts, languages, &c.

PHRENETIC VESSELS. See *Anatomy*.

PHRENSY. See *Medicine*.

PHRYGANEA, a genus of insects of the order neuroptera. The generic character is, mouth without teeth, with four feelers; stemmata three; antennæ longer than thorax; wings incumbent, the lower pair pleated.

PHRYMA, a genus of the didynamia gymnospermia class and order. The essential character is, seed one. There are two species, herbs of North America and the Cape.

PHRYNIUM, a genus of the monandria monogynia class and order. The calyx is three-leaved; petals three, equal nectarine; tube filiform; border four-parted; capsule three-celled; nuts three. There is one species, a plant of Malabar.

PHTHISIS. See *Medicine*.

PHYGETHLON, in surgery, a broad, but not much elevated tumour, of the same nature with the bubo.

PHYLACTERY, in antiquity, a charm or amulet, which being worn, was supposed to preserve people from certain evils, diseases, and dangers.

PHYLACHNE, a genus of the dioecia monandria class and order. The calyx is three leaved, superior; corolla funnel-form; fem. stigma four-cornered; capsule inferior, many-seeded. There is one [illegible]all mossy plant of South Ame-[illegible]

[illegible]A, *bastard alaternus*, a genus [illegible]ogynia order, in the pentan[illegible] plants; the perianthium five-[illegible]urbinate; petals none; capsule [illegible]. There are 20 species.

[illegible]YLLANTHUS, *sea-side laurel*; a genus of the triandria order, in the monœcia class of plants. The male calyx is six-parted; bell-shaped; no corolla; female calyx six parted; styles three, bifid; capsules three-celled; seeds solitary, roundish. There are elev[illegible] species.

PHYLLIS, a gen[illegible] the pentandria digynia class and or[illegible] The stigmas are hispid, fructificati[illegible] scattered; cal. two-leaved, obsolet[illegible]; corolla five-petalled; seeds two. There is one species, a herb of the Canaries.

PHYSALIS, the *winter cherry*, a genus of the monogynia order, in the pentandria class of plants; the corolla is wheel-shaped, stamina converging, berry within an inflate calyx, two-celled, there are seventeen species.

PHYSETER, *Cachalot*, a genus of fishes of the order cete. The generic character is teeth visible in the lower jaw only spiracle on the head or snout. Physeter macrocephalus, blunt-headed cachalot. This whale, which is one of the largest species, is scarcely inferior in size to the great mysticete, often measuring sixty feet or more in length. The head is of enormous size, constituting more than a third of the whole animal; the mouth wide, the upper lip rounded, thick or high, and much broader than the lower; which is of a somewhat sharpish form, fitting in a manner, into a longitudinal bed or groove in the upper. The teeth, at least the visible ones, as mentioned in the generic character, are situated only in the lower jaw, and when the mouth is closed, are received into so many corresponding holes or cavities in the upper, they are pretty numerous, rather blunt, and of a somewhat conic form, with a very slight bend or inclination inwards. There are also, according to Fabricius, small, curved, flattish, concave and sharp-pointed teeth, lying almost horizontally along the upper jaw, though from their peculiar situation and size, they are not visible like those of the lower, being imbedded in the fleshy interstices of the holes which receive the lower teeth, and presenting only their internal concave surfaces to meet the latter when the mouth is closed. The front of the head is very abrupt, descending perpendicularly downwards; and on its top, which has been improperly termed the neck by some authors, is an elevation or angular prominence containing the spiracle, which appears externally simple, but is double within. The head is distinguished or separated from the body by a transverse furrow or wrinkle. The eyes are small and black; and the ears or auditory passages extremely small. About the middle of the back is a kind of spurious fin, or dorsal tubercle, of a callous nature, not moveable, and somewhat abrupt or cut off behind. The tongue is of the shape of the lower jaw, clay-coloured externally, and of a dull red within. The throat is but small in proportion to the animal. The body is cylindrical beyond the pectoral fins, growing narrower towards the tail. The colour of the whole animal is black, but when advanced in age grows whitish beneath. It swims swiftly, and is said to be a violent enemy to the squalus carcharias, or white shark, which is

is obtained from this anima
celebrated perfume called
which is found in large mass
intestines, being in reality n
the fæces.

PHYSICIANS. No person w
don, nor within seven mil
same, shall exercise as a ph
surgeon, except he is exam
approved by the bishop of L
by the dean of St. Paul's,
them four doctors of physic, a
gery, other expert persons in t
of them that have been appro
the pain of forfeiture for eve
5*l.* one half to the king and
half to any that will sue. On
taken his degree of doctor of
either of the universities, may n
in London, and within seven m
same, without licence from t
of physicians.

PHYSICS, called also physio
natural philosophy, is the do
natural bodies, their phenomen
and effects, with their various
motions, operations, &c. So
immediate and proper objects
sics, are body, space, and moti

PHYSIOLOGY, is a word wh
etymological signification, com
the science of nature in general
use, however, has restricted it t
partment of physical knowledg
has alone relation to organic ex
and, indeed, when employe
generic term, without any spe
dication, it is made exclusively t
the science of animal life.

PHYSSOPHORA, a genus o
mollusca ; the generic characte
body gelatinous, pendant from a
vesicle, with gelatinous member
sides, and numerous tentacula
There are three species

to every fair and market; of which the steward of him who owns or holds the toll of the market is the judge. It was instituted to administer justice for all commercial injuries done in that very fair or market, and not in any preceding one; so that the injury must be done, complained of, heard, and determined, within the compass of one and the same day, unless the fair continues longer.

PIGEONS. Every person who shall shoot at, kill, or destroy a pigeon, may be committed to the common jail for three months, by two justices of the peace, or pay 20s. to the poor. 1 Jac. 1. c. 27.

PIKE, an offensive weapon, consisting of a shaft of wood, twelve or fourteen feet long, headed with a flat-pointed steel, called the spear.

PILASTER. See *Architecture.*

PILE, in artillery, denotes a collection or heap of shot or shells, piled up by horizontal courses into either a pyramidal or else a wedgelike form; the base being an equilateral triangle, a square, or a rectangle. In the triangle and square, the pile terminates in a single ball or point, and forms a pyramid.

PILE, in building, is used for a large stake rammed into the ground in the bottom of rivers, or in marshy land, for a foundation to build upon.

PILE ENGINE. See *Engine.*

PILE, in coinage, denotes a kind of truncheon, which in the old way of coining with the hammer, contained the arms, or other figure and inscription to be struck on the coin.

PILLAR. See *Architecture.*

PILOT, a person employed to conduct ships over bars and sands, or through intricate channels, into a road or harbour.

PILULARIA, a genus of the cryptogamia filices. There is one species.

PIMELIA, a genus of insects of the order coleoptera. The generic character is, antennæ filiform; feelers four; thorax plano-convex, margined; head exserted; shells rather rigid; wings usually none. It is divided into sections: P. antennæ, moniliform at the tip; B, entirely filiform.

PIMELITE, a mineral distinguished by a fine apple-green colour: according to Klaproth, it is composed of 35.00 silica; 15.62 oxide of nickel; 5.00 alumina; 4.58 oxide of iron; 1.25 magnesia; 37.91 water=99.36.

PIMENTO, or *Pimento, Jamaica pepper,* or *allspice,* See *Myrtus.*

PIMPINELLA, *burnet saxifrage,* a genus of the digynia order, in the pentandria class of plants. The petals are bent in; stigma subglobular; fruit ovate oblong. There are nine species.

PIN, in commerce, a little necessary instrument made of brass wire, chiefly

omen in adjusting their

;K, an alloy containing three

d four of copper: it

r of gold, but it is not

ass. See *Zinc.*

us.

L. See *Bromelia.*

PINEAL GLAND. See *Anatomy.*

PINGUICULA, *butterwort,* a genus of the monogynia order, in the diandria class of plants. The corolla is ringent, with a spur; calyx two-lipped, five-cleft; capsule one celled. There are five species.

PINGUIN, or *penguin,* in ornithology, a genus of birds of the order of anseres distinguished by the following characters: The bill is strong, straight, more or less bending towards the point, and furrowed on the sides; the nostrils are linear, and placed in the furrows; the tongue is covered with strong spines, pointing backwards; the wings are small, very like fins, and covered with no longer feathers than the rest of the body, and are useless in flight; the body is clothed with thick short feathers, having broad shafts, and placed as compactly as the scales of fishes: the legs are short, thick, and placed very near the vent; the toes are four, and are all placed forwards; the interior are loose, and the rest are webbed: the tail is very stiff, consisting of broad shafts scarcely webbed.

PINION, in mechanics, an arbor, or spindle, in the body whereof are several notches, which catch the teeth of a wheel that serves to turn it round: or it is a lesser wheel which plays in the teeth of a larger.

PINITE, a mineral that has received its name from Pini in Saxony, where it has been found in granite. Its colour is reddish brown or black; always in crystals, either rhomboidal prisms, or six sided prisms; sometimes entire; sometimes having their alternate lateral edges truncated: sometimes whole; surface smooth and brilliant; fracture uneven, passing to conchoidal; specific gravity 2.9.

PINK, a vessel used at sea, masted and rigged like other ships, only that this is built with a round stern; the bends and ribs compassing so as that her sides bulge out very much.

PINK. See *Dianthus.*

PINNA, in zoology, a genus belonging to the order of vermes testacea. The animal is a slug. The shell is bivalve, fragile, and furnished with a beard; gapes at one end; the valves hinge without a tooth.

PINNACE, a small vessel used at sea with a square stern, having sails and oars, and carrying three masts, chiefly used as a scout for intelligence, and for landing of men, &c. One of the boats belonging to a great man of war, serving to carry the officers to and from the shore, is also called the pinnace.

PINNATED LEAVES. See *Botany.*

PINNACLE, in architecture, the top or roof of a house terminating in a point.

PINUS, the *pine-tree,* a genus of the monadelphia order, in the monœcia class of plants. The male calyx is four-leaved; no corolla; stamina very many, with naked anthers; fem. cal. strobiles, with a two-flowered scale; corolla none; pistil one; nut with a membraneous wing. There are 21 species of this genus.

PIONEERS, in the art of war, are such as are commanded in from the country, to march with an army for mend-

or old hat between them, to stop
ter. Those of earth are made
potters; these are fitted into one a
one end being always made wide
the other. To join them the close
prevent their breaking, they are
ed with tow and pitch: their
is usually about that of the iron
The wooden pipes are trees bore
large iron augurs, of different siz
ginning with a less, and then pro
with a larger successively; the fi
ing pointed, the rest formed like
increasing in diameter, from one
inches or more: they are fitted in
extremities of each other, and a
by the foot.

PIPES, *tobacco*, are made of
fashions; long, short, plain, w
white, varnished, unvarnished,
various colours, &c.

PIPE also denotes a vessel or m
for wine, containing 126 gallons.

PIPE-OFFICE, is an office whe
person called the clerk of the pipe
out leases of crown lands, by w
from the lord-treasurer, or commis
of the treasury, or chancellor
exchequer. The clerk of the pipe
out also accounts of sheriffs, &c
gives the accomptants their quietus

PIPER, *pepper*, a genus of the tr
order, in the diandria class of
There is no calyx or corolla; the
is one seeded. There are 60 speci

PIPRA, the manakin, a genus of
of the order of passeres. Latham
scribes 25 different species, and
varieties.

PIRATE. By stat. 28 H. VIII. c.
treasons, felonies, robberies, mur
and confederacies committed upon
sea, or in any haven, creek, or
where the admiral has jurisdiction,
be tried in such shires or places

PITCH, a tenacious oily substance, drawn chiefly from pines and firs, and used in shipping, medicine, and various other arts; or it is more properly tar, inspissated by boiling it over a slow fire.

PITCH, *mineral*, has a strong resemblance to common pitch. Colour black, dark brown, or reddish. Specific gravity from 1.45 to 2. Does not stain the fingers. On a white iron it flames with a strong smell, and leaves a quantity of grey ashes.

PITCHSTONE. This stone, which occurs in different parts of Germany, France, and other countries, has obtained its name from some resemblance which it has been supposed to have to pitch. It is most usually in amorphous pieces of different sizes.

PITH, in vegetation, the soft spongy substance contained in the central parts of plants and trees.

PITTOSPORUM, in botany, a genus of the monogynia order, in the pentandria class of plants. The calyx is pentaphyllous, inferior, and deciduous. The petals are five in number; the style thread shaped; the capsule somewhat angular, trilocular, and containing three or four angulated seeds, adhering to the capsule by means of a liquid resin in the loculaments. Of this there are three species.

PITUITARY GLAND. See *Anatomy*.

PLACENTA. See *Anatomy* and *Midwifery*.

PLAGIANTHUS, a genus of the class and order monadelphia dodecandria. The calyx is five-cleft; petals five; berry. There is one species, a native of New Zealand.

PLAGUE, *Pestilence*, or *Pestilential Fever*. See *Medicine*.

PLAGUE-WATER, one of the compound waters of the shops, distilled from mint, rosemary, angelica-roots, &c.

PLAIN, in general, an appellation given to whatever is smooth and even, or simple, obvious, and easy to be understood; and, consequently, stands opposed to rough, enriched, or laboured.

A plain figure, in geometry, is an uniform surface, from every point of whose perimeter, right lines may be drawn to every other point in the same.

A plain angle is one contained under the two lines or surfaces, in contradistinction to a solid angle. The doctrine of plain triangles, as those included under three right lines, is termed plain trigonometry.

PLAIN CHART. See *Chart*.

PLAIN SAILING. See *Navigation*.

PLAIN SCALE. See *Scale*.

PLAIN TABLE, in surveying, a very simple instrument, whereby the draught of a field is taken on the spot, without any future protraction.

PLAIN NUMBER, is a number that may be produced by the multiplication of two numbers into one another; thus 20 is a plain number produced by the multiplication of 5 into 4.

PLAIN PLACE, locus planus, or locus ad planum, among the antient geometricians, denoted a geometrical locus, when it was a right line or a circle, in opposition to a solid place, which was an ellipsis, parabola, or hyperbola.

PLAIN PROBLEM, in mathematics, is such a problem as cannot be solved geometrically, but by the intersection either of a right line and a circle, or of the circumferences of two circles; as, given the greatest side, and the sum of the other two sides of a right-angled triangle, to find the triangle, as also to describe a trapezium that shall make a given area of four given lines.

PLAN, in general [illegible] denotes the representation of somethi[illegible] drawn on a plane, such are maps, char[illegible]hnographies, &c.

PLANARIA, a ge[illegible] of vermes intestina; the generic ch[illegible]ter is, body gelatinous, flattish, wi[illegible] double ventral pore, mouth termi[illegible]; this genus contains many species, and is divided into sections.

PLANE. See *Geo*[illegible]*metry*.

PLANE, in joine[illegible], an edged tool, or instrument, for pa[illegible]ing and shaving of wood[illegible]

PL[illegible]*ronomy*.

PL[illegible] an astronomical machine, [illegible]esent the motions of the pla[illegible]d their satellites, as they really are in nature.

In the planetarium exhibited in the plate, A represents the Sun, which is fixed firmly to a wire *a*, and has no motion; B is the planet Mercury, revolving round the Sun; D is the planet Venus; E represents the Earth, and *e* the Moon revolving round it; *f* is a segment of brass called the Earth's terminator, which shews that all the parts of the Earth behind it are not illuminated by the Sun; F is the planet Mars; G, Jupiter and his four satellites; H, Saturn, with his ring and seven satellites; K, the Herschel, and six satellites. L is a small winch, which when turned gives motion to Mercury and Venus, and shews the Earth's annual motion round the Sun, its diurnal motion, and the Moon's motion round the Earth. The projection in the middle of the circular board M, consists of the following parts: a steel wire *a*, whose lower end is screwed to a bridge under the board, and which carries the Sun; over this is put a tube, on whose lower end a worm-wheel, worked by a worm on the arbor of the winch L above-mentioned, is fixed; and to the upper end the frame of wheels N, with the Earth and Moon. Over these is a conical tube, which has a flaunch at its lower end, and is fastened to the board M by three screws; the arms carrying the planets Mars F, Jupiter G, Saturn H, and the Herschel K, are fitted stiffly upon this tube, so as not to turn unless they are moved. These planets do not move by turning the winch, but are to be set by hand, as also their satellites. In the frame of wheels N (figs. 1 and 2) *g* is the first wheel: which is fixed to the wire *a* (fig. 1), and is without any motion; this works into another wheel *h* of the same size, fixed to the spindle *i*. The wheel *h* works another wheel *k* of the same size, on whose spindle *y* (fig. 1) the Earth is fixed. Besides the wheel *h*, the spindle *i* has three other wheels *l m n*, fixed on it. The wheel *l* turns *o*, which works a pinion beneath the wheel *g*, carrying the planet Mercury B (fig. 1): this pinion has a hollow spindle, and goes over the wire *a*. The wheel

weight. Beneath this is a ring wit
sions on it, shewing the Moon'
When the winch L is turned, it wo
worm wheel beneath the board
moves the frame N (fig. 1) with the
round the Sun; and as the whe
fixed, the wheel *h* is turned by
round it; and as *k* (which it work
the same size with the other two, i
the Earth, so that its axis always pe
the pole. The wheel *l*, by means
wheel *o*, turns the pinion which
Mercury B (fig. 1). The wheel
the wheel *p* turns *g*, and the plan
nus D (fig. 1); and the wheel *n* tu
pinion *s*, and the Moon as bef
scribed.

PLANIMETRY, that part of ge
which considers lines and plane
without any regard to heights or d

PLANISPHERE, signifies a pro
of the sphere, and its various circl
plane; in which sense maps, wher
exhibited the meridians, and other
of the sphere, are planispheres.

PLANISPHERE, is more parti
used for an astronomical instrume
in observing the motions of the he
bodies. It consists of a projection
celestial sphere upon a plane, rep
ing the stars, constellations, &c.
proper order; some being projec
the meridian, and others on the e

PLANTAGO, *Plantain*, a genu
monogynia order, in the tetrandr
of plants. The calyx is four cleft,
four cleft, border reflex, stamin
long, capsules two celled, cut
versely. There are 38 species.

PLANTING, in agriculture and g
ing. The first thing in planting is
pare the ground before the trees or
are taken out of the earth, that the
remain out of the ground as short
as possible, and the next is to t

sons for planting are various, according to the different sorts of trees, or the soil in which they are planted; for the trees whose leaves fall off in winter, the best time is the beginning of October, provided the soil is dry; but if it is a very wet soil, it is better to defer it till the latter end of February, or the beginning of March; and for many kinds of evergreens, the beginning of April is by far the best season; though they may be safely removed at Midsummer, provided they are not to be carried very far; but you should always make choice of a cloudy wet season.

PLANTS, in botany, organic vegetable bodies, consisting of roots and other parts.

PLASHING *of quickset hedges*, is performed in this manner: The old stubs must be cut off, &c. within two or three inches of the ground, and the best and longest of the middle-sized shoots must be left to lay down. Some of the strongest of these must also be left to answer the purpose of stakes. These are to be cut off to the height at which the hedge is intended to be left; and they are to stand at ten feet distance one from another: when there are not proper shoots for these at the due distances, their places must be supplied with common stakes of dead wood. The hedge is to be first thinned, by cutting away all those shoots which are intended to be used either as stakes or the other work of the plashing: the ditch is to be cleaned out with the spade; and it must be now dug as at first, with sloping sides each way; and when there is any cavity on the bank on which the hedge grows, or the earth has been washed away from the roots of the shrubs, it is to be made good by facing it, as they express it, with the mould dug from the upper part of the ditch: all the rest of the earth dug out of the ditch is to be laid upon the top of the bank, and the owner should look carefully into it that this is done; for the workmen, to spare themselves trouble, are apt to throw as much as they can upon the face of the bank; which being by this means overloaded, is soon washed off into the ditch again, and a very great part of the work undone; whereas, what is laid on the top of the bank always remains there, and makes a good fence of an indifferent hedge.

PLASMA, in mineralogy. The colour of this mineral is intermediate between grass and leek green, and of different degrees of intensity. It is marked with ochre, yellow dots, and whitish spots. It occurs in angular pieces, internally it is glistening; fracture perfectly flat, conchoidal. It is hard, brittle, easily frangible; not very heavy. It has been found in Italy, Germany, and Turkey, but chiefly among the ruins of Rome. It is said that it was formerly worn by the Romans as a part of ornamental dress.

PLASTER, in pharmacy, is defined to be an external application, of a harder consistence than our ointments: these are to be spread according to the different circumstances of the wound, place, or patient, either upon linen or leather.

PLASTER, among builders, &c. The plaster of Paris is a preparation of several species of gypsums, dug near Mont Maitre, a village in the neighbourhood of Paris; whence the name.

PLATALEA, the *spoonbill*, in ornithology, a genus belonging to the order of grallæ. The beak is plain, and dilates towards the point into an orbicular form; the feet have three toes, and are half-palmated. There are three species.

PLATANUS, the *plane-tree*, a genus of the polyandria order, in the monœcia class of plants. The male calyx is an ament, globular; corolla scarcely apparent; anthers growing round the filament. Female calyx ament, globular; corolla many-petalled: stigma removed: seeds roundish, marcomate with the style, pappose at the base.

PLATBAND *of a door or window*, is used for the lintel, where that is made square, or not much arched: these platbands are usually crossed with bars of iron when they have a great bearing, but it is much better to ease them by arches of discharge built over them.

PLATFORM, in the military art, an elevation of earth, on which cannon is placed to fire on the enemy: such are the mounts in the middle of curtins. On the ramparts there is always a platform, where the cannon are mounted. It is made by the heaping up of earth on the rampart; or by an arrangement of madriers rising insensibly, for the cannon to roll on, either in a casement or on attack in the outworks. All practitioners are agreed that no shot can be depended on, unless the piece can be placed on a solid platform; for if the platform shakes with the first impulse of the powder, the piece must likewise shake, which will alter its direction, and render the shot uncertain.

PLATFORM, or *Orlop*, in a ship of war, a place on the lower deck, abaft the main-mast, between it and the cockpit, and round about the main capstan, where provision is made for the wounded men in time of action.

PLATINA. See *Platinum*.

PLATING, is the art of covering baser metals with a thin plate of silver either for use or for ornament.

PLATINUM, one of the perfect metals, has hitherto been found only in Peru, and in the mine Santa Fe, near Carthagena. The workmen of these mines must no doubt have been early acquainted with it: but they seem to have paid very little attention to it. It was unknown in Europe till Mr. Wood brought some of it from Jamaica in 1741. In 1748 it was noticed by don Antonio de Ulloa, a Spanish mathematician, who had accompanied the French academicians to Peru, in their voyage to measure a degree of the meridian. Several papers on it were published by Dr. Watson in the 46th volume of the Philosophical Transactions. These immediately attracted the attention of the most eminent chemists. In 1752, Mr. Scheffer of Sweden published the first accurate examination of its properties. He proved it to be a new metal, approaching very much to the nature of gold, and therefore gave it the name of aurum album, white gold.

PLATONIC *year*, or the *great year*, is a period of time determined by the revolution of the equinoxes, or the space wherein the stars and constellations return to their former places in respect of the equinoxes.

PLATOON, in the military art, a small square body of forty or fifty men, drawn out of a battalion of foot, and placed between the squadrons of horse, to sustain them; or in ambuscades, straits, and defiles, where there is not room for whole battalions or regiments.

PLATYLOBIUM, a genus of the diadelphia decandria class and order. The calyx is bell-shaped, five-cleft; the two upper segments very large; legume pedicelled, compressed, winged at the back. There is one species, a shrub of South Wales.

PLATYPUS, a quadruped of the order of bruta. The generic character is, mouth shaped like the bill of a duck; feet webbed.

PLEA, that which either party alleges for himself in court. These are divided into pleas of the crown and common pleas. Pleas of the crown are all suits in the king's name, against offences committed against his crown and dignity, or against his crown and peace. Common pleas are those that are held between common persons. Common pleas are either dilatory, or pleas to the action. Pleas dilatory are such as tend merely to delay or put off the suit, by questioning the propriety of the remedy rather than by denying the injury. Pleas to the action are such as dispute the very cause of suit. 3 Black. 301.

PLEADINGS, in general, signify the allegations of parties to suits when they are put into a proper and legal form; and are distinguished in respect to the parties who plead them, by the names of bars, replications, rejoinders, sur-rejoinders, rebutters, sur-rebutters, &c. and though the matter in the declaration of court does not properly come under the name of pleading, yet, being often comprehended in the extended sense of the word, it is generally considered under this head.

PLECTRANTHUS, a genus of the gymnospermia order, in the didynamia class of plants, and in the natural method ranking under the 42d order, verticillatæ. The calyx is monophyllous, short, and bilabiated; the upper lip of which is large, oval, and bent upwards; the inferior lip is quadrifid, and divided into two laciniæ: the corolla is monopetalous, ringent, and turned back; the labiæ look different ways, and from the base of the tube there is a nectarium like a spur; the filaments are in a declining situation, with simple antheræ; the stylus filiform; the stigma bifid. It has four seeds, covered only by the calyx. There are five species.

PLECTROMIA, a genus of the class and order pentandria monogynia. The petals are five; berry two-seeded, inferior. There is one species, a tree of the Cape.

PLEIADES, in astronomy, an assemblage of stars in the neck of the constellation Taurus.

PLENE ADMINISTRAVIT, a plea pleaded by an executor or administra
where they have administered the
ceased's estate faithfully and justly bef
the action brought against them.

PLENUM, in physics, denotes, acco
ing to the Cartesians, that state of thi
wherein every part of space is s
posed to be full of matter; in opposit
to a vacuum.

PLENUS *flos*, in botany, *a full flow*
a term expressive of the highest degree
luxuriance in flowers. The petals in
flowers are so multiplied as to exclu
all the stamina, and frequently to ch
up the female organ, so that such flo
ers, though delightful to the eye, are
getable monsters. Flowers with m
than one petal are most liable to th
such are the ranunculus, anemo
poppy, myrtle, &c. &c. Flowers w
one petal only are but seldom subject
this fulness; these, however, are not
tally exempt, as may be seen in the d
ble polyanthus, hyacinth, crocus,
In flowers with one petal, the mode
luxuriance, or impletion, is by a m
tiplication of the divisions of the lin
or upper part. In flowers with m
than one petal by a multiplication of
petals or nectarium.

PLEURISY, in medicine, a violent p
in the side, attended with an acute fe
a cough, and a difficulty of breathing.

PLINIA, a genus of plants of the p
andria monogynia class. The emp
ment is divided into five segments;
flower consists of five petals; the sta
na are numerous filaments, slen
and as long as the flower; the anthera
small, and so is the germen of the
til; the style is subulated, and of
length of the stamina; the stigma is
ple: the fruit is a large globose ber
a striated or sulcated surface, cont
only one cell, in which is a very
smooth, and globose seed. There a
species, trees of America.

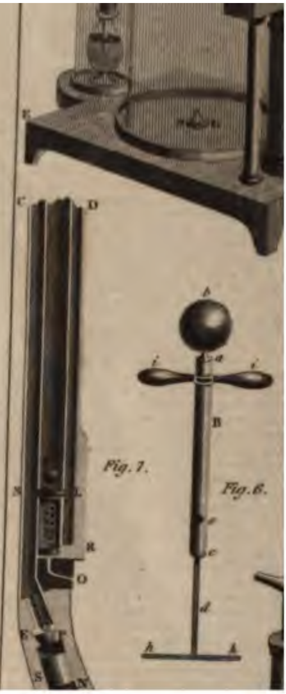
PLINTH, in architecture, a flat
member, in the form of a brick
used as the foundation of column
that flat square table, under the
ing of the base and pedestal at the
of the whole order. It seems to ha
originally intended to keep the l
the original wooden pillars from r

PLINTH *of a statue*, &c. is a
ther flat, round, or square, that
support it.

PLINTH *of a wall*, denotes tw
rows of bricks advancing out fro
or, in general, any flat high
that serves in a front wall to
floors, to sustain the eaves of
the larmier of a chimney.

PLOCAMA, in botany, a g
pentandria monogynia class
Essential character: calyx
superior; corolla bell-shape
berry three-celled; cells
There is but one species, viz
pendulous plocama, a nat
nary islands.

PLOT, in dramatic poet
times used for the fable of
comedy, but more particul
or intrigue, which makes
of any piece. The unrav
end to the plot.


E
C
D
Fig. 7.
N
L
R
O
E
S
N
b
a
i
i
B
Fig. 6.
e
c
d
h
h

PLOT, in surveying, the plan or draught of any field, farm, or manor surveyed with an instrument, and laid down in the proper figure and dimensions.

PLOTTING, among surveyors, is the art of laying down on paper, &c. the several angles and lines of a tract of ground surveyed by a theodolite, &c. and a chain.

PLOTUS, or *Darter*, a genus of birds of the order anseres. The generic character is, bill straight, pointed, toothed; nostrils a slit near the base; face and chin naked; legs short, all the toes connected. Of this genus there are three species.

PLOUGH, in agriculture, a machine for turning up the soil, contrived to save the time, labour, and expence that without this instrument must have been employed in digging land, to prepare it for the sowing of all kinds of grain.

PLOUGH, among bookbinders, a machine for cutting the edges of [illegible] leaves of books smooth.

PLUKENETIA, a genus of th[illegible] necia monadelphia class and orde[illegible] male and female flowers are pr[illegible] separately on the same plant; [illegible] rolla is composed of four oval and patent petals, and the stamina form a short pyramidal body; the fruit is a depressed quadrangular capsule, containing a single roundish and compressed seed. There is one species.

PLUM TREE. See *Prunus*.

PLUMBAGO, *lead-wort*, a genus of the monogynia order, in the pentandria class of plants. The corolla is funnel-form; stamina inserted in scales, inclosing the base of the corolla: stigma five-cleft; seed one. There are seven species.

PLUMBERY, the art of casting and working lead, and using it in buildings.

PLUMERIA, a genus of the pentandria monogynia class of plants, the corolla of which consists of a single funnel-like petal, with a long tube, and divided into five oblong segments at the limb: the fruit is composed of two jointed and ventricose follicles, formed of a single valve each, and containing numerous oblong seeds. There are four species.

PLUMMET, among artificers, denotes a perpendicular to the horizon; so called as being commonly erected by means of a plummet.

PLUMMING, among miners, is the method of using a mine-dial, in order to know the exact place of the work where to sink down an air-shaft, or to bring an adit to the work, or to know which way the load inclines when any flexure happens in it.

PLUNGER, in mechanics, the same with the forcer of a pump.

PLURALITY. If any person having one benefice with cure of souls of eight pounds a year in the king's books, shall accept another of whatsoever value, and [illegible] to the same, [illegible] e void; un- [illegible] om the arch- [illegible] as power to [illegible] atic [illegible] plains of no- [illegible] men and others under proper qualifi- [illegible] ons, to hold two livings, provided [illegible] are not more than thirty miles distant from each other, and provided that he resides in each for a reasonable time every year, and that he keeps a sufficient curate in that in which he does not ordinarily reside.

PLUS, in algebra, a character marked thus +, used for the sign of addition.

PLUSH, in commerce, &c. a kind of stuff leaving a sort of velvet knap, or shag, on one side, composed regularly of a woof of a single woollen thread, and a double warp, the one wool, of two threads twisted, the other goats or camel's hair; though there are some plushes entirely of worsted, and others composed wholly of hair.

PLUVIAMETER, a machine for measuring the quantity of rain that falls.

PNEUMATICS. Though the word pneumatics means, strictly, the science which treats of the properties of air in general, yet it is commonly used to ex- [illegible] l properties of elas- [illegible] ; such as their weight, [illegible] bility, and elasti- [illegible] her fluids in the [illegible] s: 1. It can be co[illegible] ess space than it na[illegible] 2. It cannot be con- ge[illegible] as other fluids may: 3. It is [illegible] rent density in every part up- w[illegible] n the earth's surface; decreasing in its weight, bulk for bulk, the higher it rises; 4. It is of an elastic or springy nature, and the force of its spring is equal to its weight.

The invisibility of air, is only the consequence of its transparency; but it is possessed of all the common properties of matter. When a vessel is empty, in the usual way of speaking, it is in fact still filled with air.

But it is possible to empty a vessel even of the air which it contains, by which means we shall be able to discover several properties of this fluid. The instrument, or machine, by which this operation is performed, is called an air-pump. As it is by means of this useful instrument that all the mechanical properties of air are demonstrated, it will be necessary to describe its construction, and the manner of using it before we proceed to the experiments that are made with it.

Plate Pneumatics, fig. 1. is the air-pump that is now most in use. A A are two brass barrels, each containing a piston, with a valve opening upwards. They are worked by means of the winch B, which has a pinion that fits into the teeth of the racks CC, which are made upon the ends of the pistons, and by this means moves them up and down alternately.

On the square wooden frame DE, there is placed a brass plate G, ground perfectly flat, and also a brass tube, let into the wood, communicating with the two barrels, and the cock I, and opening into the centre of the brass plate at *a*. The glass vessel K, to be emptied or exhausted of air, has its rim ground quite flat, and rubbed with a little pomatum, or hog's-lard, to make it fit more closely upon the brass plate of the pump. These vessels are called receivers. Having shut the cock I, the pistons are worked by the winch; and the air being suffered

ceiver, let down the tube into
silver, which will not rise into
as long as the receiver continu
But re-admit the air, and the q
will immediately ascend.

Air is one of the most elastic
nature; that is, it is easily comp
to less compass, and when the p
removed, it immediately regain
mer bulk.

Let mercury be poured int
tube ABCD (fig. 3.) open at bot
a small height as BC; then stop
end D with a cork, or otherwise
measure the length of confined a
pour mercury into the other leg
the height above the surface of
is equal to the height at which it
the barometer at the time. T
plain, that the air in the shorter
be compressed with a force twic
as at first, when it possessed th
space CD; for then it was co
only with the weight of the atm
but now it is compressed by th
and the additional equal weight
lumn of mercury. The surfac
mercury will now be at E; and
found, upon measuring it, that t
DE, into which the air is comp
just half the former CD. If an
lumn of mercury was added,
the former, it would be reduced
third of the space it formerly
Hence the density of air is pro
to the force that compresses it.

The elastic power of the air is
equivalent to the force which co
it: for if it was less, it would yi
pressure, and be more compres
it greater, it would not be so mu
ed: for action and re-action ar
equal; so that the elastic force of
portion of the air we breathe,
to the weight of the incumbent

the valve EP into the cavity between the two barrels. The ball K is put into its place, in the same way as in another gun. There is a valve at SL, which being opened by the trigger O, permits the air to come behind the bullet, so as to drive it out with great force. If the valve is suddenly opened and closed, one charge of condensed air, may make several discharges of bullets; because only part of the air will go out at a time, and a fresh bullet may be put into the place K. There are a few other air-guns, which our limits prevent us from describing.

PNEUMORA, a genus of insects of the order hemiptera. The generic character is, body ovate, inflated, diaphanous; head inflected, armed with jaws; thorax convex, carinate beneath; wing-cases deflected, membranaceous; legs formed for running.

POA, *meadow grass*, a genus of the dygínia order, in the pentandria class of plants, and in the natural method ranking under the 4th order, gramina. The calyx is bivalved and multiflorous; the spicula or partial spike is ovate, with the valvules scarious, and a little sharp or thin on the margin. There are 71 species.

POCKET, in the woollen trade, a word used to denote a larger sort of bag, in which wool is packed up to be sent from one part of the kingdom to another. The pocket contains usually twenty-five hundred weight of wool.

PODOPHYLLUM, a genus of the monogynia order, in the polyandria class of plants, and in the natural method ranking under the 27th order rhœadeæ. The corolla has nine petals: the calyx is triphyllous; the berry unilocular, crowned with the stigma. There are two species, creeping plants of North America.

PODURA, a genus of insects of the order aptera. The generic character is, legs six, formed for running: eyes two, composed of eight; tail forked, formed for leaping, inflected; antennæ setaceous, elongated.

POEM. See *Poetry*.

POETRY is that kind of literary composition which is characterised by metrical harmony, and is, by its very nature, incapable of accurate definition.

In the English language, versification depends on the modulation of the accents, and the disposition of the pauses, to which is generally added the recurrence of rhyme. The heroic verse consists of ten syllables; its harmony is produced by a certain proportionate distribution of accented and unaccented syllables; and its specific character, whether lively or solemn, soft or slow, is determined by their order and arrangement. When unaccented and accented syllables are regularly alternated, it is called the iambic verse; as,

"A shepherd's boy, he seeks no higher name,
Led forth his flock beside the silver Thame."

When this order is inverted, and the unaccented is preceded by the accented syllable, it is called a trochaic verse; as,

"Ambition ***first sprung*** from the blest abodes."

"*Take*, holy earth, *all* that my soul holds dear."

The heroic verse is often diversified by the intervention of an Alexandrine line of twelve syllables, which is liberally used by Dryden: its abuse is pointedly censured by Pope:

"A needless Alexandrine ends the song,
Which, like a wounded snake, drags its slow length along."

It forms a noble termination:

"Teach me to love and to forgive;
Exact my own defects to scan,
What others are to feel, and know myself a man."

The common anapestic verse, of eleven and twelve syllables, in which the accent falls on every third syllable, has generally been appropriated to humorous subjects: when formed into the stanza, it assumes a different character. In the noble war-song of Burns it is however a strain truly sublime; and in the following passage flows with equal sweetness and pathos:

"'Tis night, and the landscape is lovely no more:
I mourn, but, ye woodlands, I mourn not for you;
For morn is approaching, your charms to restore,
Perfum'd with fresh fragrance, and glittering with dew.
Nor yet for the ravage of winter I mourn;
Kind Nature the embryo blossom will save:
But when shall spring visit the mouldering urn?
Oh! when shall it dawn on the night of the grave?"

The occurrence of double rhymes is neither very frequent nor very easy in English verse; they are chiefly employed in songs, and are seldom admitted in the higher order of lyrical composition. The following passage from Dryden's ode on St. Cecilia's day, affords the most happy example of this kind of verse in our language.

"Softly sweet in Lydian measures,
Soon he sooth'd his soul to pleasures;
War, he sung, is toil and trouble,
Honour but an empty bubble;
Never ending still beginning,
Fighting still, and still destroying:
If the world be worth thy winning
Think, oh! think it worth enjoying."

The simplest and most fluent of all verse is the couplet of eight syllables. In this measure, Milton has written his two exquisite poems, the Allegro and Penseroso.

"And may at length my weary age
Find out the peaceful hermitage,
The hairy gown and mossy cell,
Where I may sit and rightly spell
Of every star that heaven doth shew,
And every herb that sips the dew,

Till old experience do attain
To something like prophetic strain!"

Blank verse is composed of lines of ten syllables each, which flow into each other without the intervention of rhymes; its metrical principles resides in its pauses, which should be so judiciously spread as never to suffer the accompaniment of rhyme to be missed. The following short extracts may illustrate the difference of style perceptible in the various writers of blank verse:

"Of man's first disobedience, and the fruit
Of that forbidden tree whose mortal taste
Brought death into the world, and all our woe,
With loss of Eden, till one greater man
Restore us, and regain the blissful seat,
Sing, heavenly muse, that on the secret top
Of Oreb, or of Sinai, did'st inspire
The shepherd who first taught the chosen seed,
In the beginning how the heavens and earth
Rose out of chaos; or if Sion hill
Delight thee more, and Siloa's brook that flowed
Fast by the oracle of God, I thence
Invoke thy aid to my adventurous song;
That with no middle flight intends to soar
Above the Aonian mount while it pursues
Things unattempted yet in prose or rhyme." *Milton.*

"He comes! he comes! in every breeze, the power
Of philosophic melancholy comes:
His near approach the sudden-starting tear,
The glowing cheek, the mild dejected air,
The soften'd feature, and the beating heart
Pierc'd deep with many a virtuous pang, declare.
O'er all the soul his sacred influence breathes,
Inflames imagination, through the breast
Infuses every tenderness, and far
Beyond dim earth exalts the swelling thought." *Thomson.*

"From heaven my strains begin; from heaven descends
The flame of genius to the chosen heart,
And beauty with poetic wonder join'd
And inspiration. Ere the rising sun
Shone o'er the deep, or mid the vault of night
The moon her silver lamp suspended; ere
The vales with spring were watered, or with groves
Of oak or pine, the antient hills were crown'd;
Then the great Spirit whom his works adore,
Within his own deep essence view'd the forms,
The forms eternal of created things:
The radiant sun, the moon's nocturnal lamp,
The mountains and the streams, the ample stores
Of earth, of heaven, of nature. From the first,
On that full scene his love divine he fix'd,
His admiration; till in time complete,
What he admired and lov'd, his vital power
Unfolded into being." *Akenside.*

"O ye whose souls relentless love has tam'd
To soft distress, or friend untimely fallen;
Court not the luxury of tender thought;
Nor deem it impious to forget those pains
That hurt the living, nought avail the dead:
Go, soft enthusiast, quit the cypress groves;
Nor to the rivulets lonely moanings tune
Your sad complaint. Go, seek the cheerful haunts
Of men, and mingle with the bustling crowd;
Lay schemes for wealth, or power, or fame—the wish
Of nobler minds, and push them night and day;
Or join the caravan, in quest of scenes
New to your eyes, and shifting every hour,
Beyond the Alps, beyond the Appenines." *Armstrong.*

"O winter, ruler of the inverted year,
Thy scattered hair, with sleet like ashes fill'd
Thy breath congeal'd upon thy lips, thy cheeks
Fring'd with a beard made white with other snows
Than those of age; thy forehead wrapt in clouds,
A leafless branch thy sceptre, and thy throne
A sliding car indebted to no wheels,
But urg'd by storms along its slippery way,
I love thee, all unlovely as thou seem'st,
And dreaded as thou art. Thou hold'st the sun
A prisoner in the yet undawning east,
Short'ning his journey between morn and noon
And hurrying him, impatient of his stay,
Down to the rosy west; but kindly still
Compensating his loss with added hours
Of social converse, and instructive ease." *Cowper.*

Attempts have been made to enlarge the limits of blank verse, by the introduction of various measures analogous to those employed in rhyme: but to all these efforts the genius of the language discovers an invincible repugnance; vainly are varieties presented to the eye, which are imperceptible to the mind, and untasted by the ear. All rhymeless numbers either flow into good blank verse, or form lines harsh and intractable; a succession of abrupt sounds and mutilated sentences, which by no art of typography, by no imposition of nomenclature, can be made to constitute any metre at all.

Poetical classification. *Pastoral* poetry is, above all other, the most limited in its

when formed on the model
as by Virgil and Theocritus,
description of rural scenes
eelings, enriched with ele-
:, and adorned by the most
umbers.
l is perhaps the happiest
storal poetry, and there are
ge many ballads of exqui-
Some of our pastorals are
h is Milton's monody on

oth, ere the high lawns ap-

pening eyelid of the Morn,
eld; and both together heard
e grey fly winds her sultry

flocks with the fresh dews

r that rose at evening bright,
ven's descent had slop'd his
wheel."

usion of this poem is in the
elegant pastoral:

he uncouth swain to th' oaks

l Morn went out in sandals

e tender stops of various

hought, warbling his Doric

sun had stretch'd out all

as dropt into the western

e, and twitch'd his mantle

fresh woods, and pastures

of *Elegy* was originally given
nody, but was afterwards
l plaintive strains. In the
ge it was always written in
nd pentameter verse. By
an elegiac stanza was invent-
ng as nearly as possible with
elodious numbers. Many
perhaps the best, are ex-
y of soothing tenderness.
ose of Tibullus, so happily
Hammond. The Jesse of
hich has perhaps never been
all pathos. The celebrated
y combines every charm of
nd sentiment. The elegiac
onotony of which soon be-
essive to the ear, is some-
ly exchanged for a lighter
in Cowper's Juan Fernan-

that have made me your

is desolate shore
al endearing report
hall visit no more.
do they now and then send
thought after me!
e I yet have a friend,
nd I am never to see."

represents in an abridged
ent elegy; the same slow stanza is assigned to each, and the sentiments suitable to the one are appropriate to the other. It is always limited to fourteen lines, an artificial character which should seem to indicate an Oriental extraction. The following, by Milton, is a fine specimen of the English sonnet in the Italian manner:

"O nightingale, that on yon leafy spray
Wast blest at eve, when all the woods are still!
Thou with fresh hopes the lover's heart dost fill.
When the jolly Hours lead on propitious May.
Thy liquid notes, that close the eye of day,
First heard before the shallow cuckoo's bill,
Portend success in love. Oh! if Jove's will
Have link'd that amorous power to thy soft lay,
Now timely sing, ere the rude bird of hate
Foretell my hopeless doom in some grove nigh,
As thou from year to year hast sung too late
For my relief, yet hadst no reason why.
Whether the muse or Love call thee his mate,
Both them I serve, and of their train, am I."

In the following sonnet, which is of a modern date, the stanza is happily accommodated to the English language:

Written in the church-yard of Middleton, Sussex.

"Press'd by the moon, mute arbitress of tides,
Whilst the loud equinox its power combines,
The sea no more its swelling surge confines,
But o'er the shrinking land sublimely rides.
The wild blast rising from the western cave,
Drives the huge billows from their heaving bed,
Tears from their grassy tombs the village dead,
And breaks the silent sabbath of the grave.
With shells and sea-weed mingled on the shore,
Lo! their bones whiten on the frequent wave.
But vain to them the winds and waters rave,
They hear the warring elements no more;
While I am doom'd, by life's long storm opprest,
To gaze with envy on their gloomy rest."

Pope's Elegy to an Unfortunate Lady and his Eloisa, are in heroic verse; which, in the hands of that great master, is adequate to the expression of every feeling.

Lyric poetry is versatile, and miscellaneous, admitting almost every diversity of measure and of subject. Love and heroism, friendship and devotional sentiment, the triumphs of beauty and the praises of patriotism, are all appropriate to lyrical composition. The soul of enthusiasm the spirit of philosophy, the voice of ations in which an author may become a practical teacher, without ceasing to be the poet: and this difficulty is aggravated to the English writer, who has not the resources of the Greek and Roman in the metrical capacities of his language.

Satirical poetry is descriptive of men and manners; its aim is to delineate the follies and chastise the vices of the age. Satire is evidently the offspring of polished times; and, unlike other poets, the satirist finds his empire enlarged, and his influence extended, by the progress of society.

Satire is either pointed or oblique: eloquence is the soul of the one, ridicule of the other. The one rushes on its object in a torrent of vehemence and declamation; the other pursues a smooth tortuous course, occasionally reflecting to the mind the most momentous truths in the playful aspect of wit and humour.

Epic poetry concentrates all that is sublime in action, description, or sentiment. In the structure of a regular fepic poem, criticism requires that the able should be founded in fact, and that fiction should fill the picture of which the outline is traced by truth. In the conduct of the poem, it is exacted that the machinery be subservient to the main design, and that the action should be simple and uniform. There are however many poems of the epic or heroic cast to which criticism has hitherto assigned no name.

It is obvious, that the poetical nomenclature established on classical authority, is not sufficiently extensive to include all the compositions of modern times. To what classical school shall we refer the noble ethics of Pope in his Epistles, and of Cowper in his Task? By what name shall we designate the Traveller and the Deserted Village, the Pleasures of Memory, the Pleasures of Hope, neither of which is like the Pleasures of Imagination, included in the didactic species, with many other exquisite productions.

Originally the drama was a metrical

I never gave you kingdoms, call'd you children;
You owe me no subscription."

Of metrical harmony and poetical emotion. Metrical harmony is but the medium by which the poet transmits his ideas and sentiments: it constitutes the fabric into which his conceptions are wrought, the form in which his sentiments are exhibited. Metrical harmony is common to all who assume the name of poets; from the humble versifier creeping through hedge-rows of rhyme at the foot of Parnassus, to the son of genius, who has drunk of inspiration at its source, and rides

"Upon the seraph wing of ecstasy."

Poetical emotion springs from admiration or from sympathy, and may be awakened by the novelty or the renovation of sensation. It may arise from combinations new to the fancy, or from recollections interesting to the heart. In the energy of his conceptions, and in the charm of his expression, resides all the poet's power. There are no features of sublimity and magnificence, no touches of tenderness or pathos, but may be traced to those two sources of poetical excellence. Sublimity originates in the amplitude of the poet's mind, and is discovered in the majesty of his images, or the grandeur of his sentiment: a sensation of terror, mingled with admiration, also belongs to the sublime.

In sublime composition no image should be introduced which is not calculated to impress the mind with feelings of solemnity. Milton's description of Satan exemplifies the union of sublime imagery, with sublimity of sentiment.

An energetic simplicity is essential to the sublime, which disclaims artificial ornament. Description includes many of the elements of poetry, and alternately produces emotions of sublimity and beauty. The figurative style is often assumed, in order to give more richness and vividness to description. The elements are thus embodied, and more and evening are perpetually represented under some popular and pleasing image. Thus Milton personifies the morning:

"Now morn, her early steps in the eastern clime
Advancing, sowed the earth with orient pearl."

And Shakspeare:

"But see, the Morn, in russet mantle clad,
Walks o'er the dews of yon high eastern hill."

Description is sometimes rendered
more lively by the introduction of a figu-
fusion; thus in the Allegro, Milton
es his description of sun-rise;

etimes walking not unseen,
ge-row elms, or hillocks green,
against the eastern gate,
here the great sun begins his state,
Rob'd in flames and amber light,
The clouds in thousand liveries dight."

In general description, it is the poet's object to force on the mind a variety of brilliant ideas and vivid impressions. In his local or individual delineations, he presents images palpable to the imagination, and almost to the senses; he stimulates latent feelings, or renovates forgotten sensations. In the combination of artificial imagery, he employs the power of novelty; in that of simple images, he relies on the charm of truth. With the one the attention is awakened, by the other it is absorbed. The reader perceives in himself a capacity for forming associations till then unknown; but he is yet more pleased to retrace scenes and sentiments familiar to memory, and dear to the heart. In one instance he is astonished by the variety of the poet's conceptions, in the other he is enchanted by the fidelity of his imitations. The magnificence of figurative language and metaphorical description extorts admiration; the simplicity of natural images inspires delight. In local description the poet should introduce only such objects as harmonize perfectly with his design.

There is in local description a charm that renders objects, in themselves uncongenial engaging to the mind. The following passage presents few images of beauty; but in contemplating it, who does not feel, that without being removed from the common walk of nature, he is visited by the influences of poetry?

"The day is come, when I again repose
Here under this dark sycamore, and view
Those plots of cottage ground, the orchard tufts,
Which at this season with their unripe fruits,
Among the woods and copses lose themselves,
Nor with their green and simple hues disturb
The wild green landscape. Once again I see
Hedge-rows, then hardly hedge-rows, little lines
Of sportive wood run wild. These pastoral farms
Green to the very door, and wreathes of smoke
Sent up in silence from among the trees;
With some uncertain notice, as might seem,
Of vagrant dwellers in the fenceless woods;
Or of some hermit's cave, where by his fire
The hermit sits alone."

If such is the charm of local scenery, yet greater is the captivation of that individual and characteristic sentiment, which from its appropriation to the drama, has been called dramatic. Such indeed is its enchantment, that it has been found capable of producing the most exquisite emotion, without any auxiliary embellishments from figurative language

pathos and tenderness.
The *curiosa felicitas*, that cha
licity of expression which Horac
pily exemplified, is one of the n
erful agents in producing poeti
tion. It is the attribute which
only to the poet of nature; a
effusion of some fortunate
when consummate judgment
impelled and inspired by exqu
ing. The spirit of poetry is not
to subjects of dignity and imp
it may be perceived in a simpl
even in a sportive song. It vis
pho, as it had sojourned with
and was as truly the attendant
critus as of Homer. Nor is
emotion inspired only by the so
roes and of gods. It may be
even by the strain of playful te
in which the lover celebrates s
ing of his mistress.
POHLIA, a genus of the cla
der cryptogamia musci, includ
bryonia of Linnæus.
POINCIANA, *Barbadoes flow*
genus of the monogynia order,
candria class of plants, and
tural method ranking under t
der, lomentaceæ. The calyx
phyllous; the petals five, the
larger than the rest; the star
and all fertile; the seed vessel
There is only one species, viz.
cherrima, a native of both Indi
POINT, in geometry, as d
Euclid, is a quantity which ha
or which is indivisible. Poin
ends or extremities of lines.
supposed to be moved any w
by its motion, describe a line.
POINT, in music. This wo
joined with others, has variou
tions. The different uses to wh
were formerly applied, rend

POLIANTHES, the *tuberose*, a genus of the monogynia order, in the hexandria class of plants; and in the natural method ranking under the 10th order, coronariæ. The corolla is funnel-shaped, incurvated, and equal; the filaments are inserted into the throat of the corolla, in the bottom of which the germen is situated. There is but one species.

POLICY of ASSURANCE, the deed or instrument by which a contract of assurance is effected.

POLIERSHIEFER, a mineral body found chiefly at Menil Montant, near Paris.

POLISHER, or *burnisher*, among mechanics, an instrument for polishing and burnishing things proper to take a polish.

POLISHING, in general, the operation of giving a gloss or lustre to certain substances, as metals, glass, marble, &c.

POLITICAL ARITHMETIC, calculations relating to the wealth of nations. Political arithmetic does not determine in what national wealth truly consists, but estimates the value of whatever passes under this name, and distinguishes the proportions in which the component articles may be applied to purposes conducive to the safety or prosperity of the community.

POLIUM. See *Teucrium*.

POLL, a word used in antient writings for the head.

POLL-MONEY, a capitation or tax, imposed by the authority of parliament on the head or person either of all indifferently, or according to some known mark of distinction.

POLLIA, a genus of the class and order hexandria monogynia. The corolla is inferior, six-petalled; berry many-seeded. There is one species, an herbaceous plant of Japan.

POLLICHIA, a genus of the monandria monogynia class and order. The calyx is one-leafed, five-toothed; corolla five petals; seeds solitary; receptacle succulent, aggregate scales. There is one species, of the Cape.

POLLUX, in astronomy, a fixed star of the second magnitude in the constellation Gemini, or the Twins. See *Astronomy*.

POLYADELPHIA, the name of the 18th class of Linnæus's sexual system, consisting of plants with hermaphrodite flowers, in which several stamina or male organs are united by their filaments into three or more distinct bundles.

POLYANDRIA the name of the 13th class in Linnæus's sexual method, consisting of plants with hermaphrodite flowers, which are furnished with several stamina that are inserted into the common receptacle of the flower.

POLYCARDIA, a genus of the class and order pentandria monogynia. The petals are five; stigma lobed; capsules five-celled; seeds arilled. There is one species, a shrub of Madagascar.

POLYCARPON, a genus of the class and order triandria trigynia. The calyx is five-leaved; petals five; capsule one celled; seeds many, There is one species.

POLYCNEMUM, a genus of the monogynia order, in the triandria class of plants, and in the natural method ranking under the 12th order, holoraceæ. The calyx is triphyllous; and there are five calciform petals, with one seed almost naked. There are five species, of no note.

POLYGALA, *milkwort*, a genus of the octandria order, in the diadelphia class of plants, and in the natural method ranking under the 33d order, lomentaceæ. the calyx is pentaphyllous, with two of its leaflets wing-shaped and coloured; the legumen is obcordate and bilocular. There are 45 species.

POLYGAMIA. This term, expressing an intercommunication of sexes, is applied, by Linnæus, both to plants and flowers. A polygamous plant is that which bears both hermaphrodite flowers and male or female, or both.

POLYGAMY, the plurality of wives or husbands, in the possession of one man or woman, at the same time.

POLYGLOTT, among divines and critics, chiefly denotes a bible printed in several languages.

POLYGON, in geometry, a figure with many sides, or whose perimeter consists of more than four sides at least: such are the pentagon, hexagon, heptagon, &c.

POLYGON, in fortification, denotes the figure of a town or other fortress.

Line of polygons, on the French sectors is a line containing the homologous sides of the first nine regular polygons inscribed in the same circle; that is, from an equilateral triangle to a dodecagon.

POLYGONAL NUMBERS, are so called because the unit, whereof they consist, may be disposed in such a manner as to represent several regular polygons.

POLYGONUM, *knot-grass*; a genus of the trigynia order, in the octandria class of plants, and in the natural method ranking under the 12th order, holoraceæ. There is no calyx; the corolla is quinquepartite and calycine, or serving instead of a calyx; there is one angulated seed. There are 36 species.

POLYGYNIA, among botanists, denotes an order or subdivision of a class of plants, comprehending such plants of that class as have a great number of pistils, or female organs of generation.

POLYHEDRON, in geometry, denotes a body or solid comprehended under many sides or planes.

POLYHEDRON, *polyscope*, in optics, is a multiplying-glass or lens, consisting of several plane surfaces disposed into a convex form.

POLYMNIA, a genus of the polygamia necessaria order, in the syngenesia class of plants, and in the natural method ranking under the 49th order, compositæ. The receptacle is paleaceous; there is no pappus; the exterior calyx is tetraphyllous, or pentaphyllous; the interior decaphyllous, and composed of concave leaflets. There are five species.

POLYNEMUS, *polyneme*, a genus of fishes of the order abdominales. The generic character is, head compressed, covered with scales; snout very obtuse and prominent; gill-membrane five or seven-rayed; separate filaments or setaceous processes near the base of the pectoral fins.

popular
fresh-water insects, which
genus of hydra, of the ord
zoophytæ.

POLTYRICHUM, a gen
of musci, in the cryptog
plants. The anthera is ope
placed upon a very small
articulation; the calyptra
star of the female is on
dividual. There are 19 spe

POMETIA, a genus of
hexandria class and order.
one-leaved, six-cleft; pet
stamina six; female, berry
seed in the centre. There
cies.

POMMEREULIA, a genus
gynia order, in the triandria
and in the natural method
the fourth order, gramina.

PONŒA, a genus of the
gynia class and order. The
parted, spreading; petals
three-sided; capsules three-w
celled. There is one specie
Guiana.

PONTEDERIA, in botany,
the monogynia order, in t
class of plants; and in the na
ranking under the sixth or
The corolla is monopetal
bilabiate; there are three sta
ed into the top, and three in
of the corolla; the capsule
There are seven species, aq
East Indies.

PONTON, or *Pontoon*, in w
a little floating bridge made o
planks. The ponton is a m
sisting of two vessels, at a littl
joined by beams, with planks
for the passage of the cavalry, t
infantry, &c. over a river, or
the sea, &c.

POOP, the stern of a ship, o
est, uppermost, and hinder p
ship's hull.

POOR'S RATE, a tax levied i

re put the muzzles of the great guns. hese are shut up in storms, to prevent e water from driving through them.

PORTER, a kind of malt liquor, which iffers from ale and pale beer in being ude of high-dried malt.

PORTLANDSTONE, is a dull whitish pecies much used in buildings about ondon. It is composed of a coarse grit, emented together by an earthy spar.

PORTLANDIA, a genus of the mono- ynia order, in the pontandria class of lants, and in the natural method ranking ith those of which the order is doubtful. he corolla is elevated and funnel-shap- d; the antheræ are longitudinal; the psule pentagonal, and retuse at top, locular, and crowned with a pentaphyl- us calyx. There are four species.

PORTRAIT. See *Painting*.

PORTULACA, *purslane*, a genus of the onogynia order, in the dodecandria ass of plants, and in the natural method nking under the 13th order, succulentæ, e corolla is pentapetalous; the calyx fid; the capsule unilocular, and cut und. There are 12 species.

PORTULACARIA, a genus of the class d order pentandria trigynia. The calyx two-leaved; the petals five; seed one, ree-sided and winged. There is one ecies, called purslane-tree.

POSITION, or the rule of false posi- on, otherwise called the rule of false- ood, in arithmetic, is a rule so called, ecause in calculating on several false umbers taken at random, as if they ere the true ones, and from the diffe- ences found therein, the number sought determined. This rule is either sin- le or double. Single position is when ere happens in the propositions some artition of numbers into parts propor- onal, in which case the question may e ~~resolved at one operation~~, by this ale: Imagine a number at pleasure, and ork therewith according to the tenor of e question, as if it were the true num- er; and what proportion there is be- ween the false conclusion and the false roportion, such proportion the given umber has to the number sought. herefore the number found by argu- entation, shall be the first term of the ule of three; the second number sup- osed, the second term; and the giv- n number, the third. Or the result is be regulated by this proportion, viz. s the total arising from the error, to e true total, so is the supposed part to e true one. Example: A, B, and C, esigning to buy a quantity of lead to e value of 140l. agree that B shall ay as much again as A, and C as much gain as B; what then must each pay?

Now suppose A to pay 10l. then B must ay 20l. and C 40l. the total of which is l. but it should be 140l. Therefore, if l. should be 140l. what should 10l. be?

Answer, 20l. for A's share, which dou- led, makes 40l. for B's share, and that gain doubled, gives 80l. for C's share, e total of which is 140l.

Double position, is when there can be o partition in the numbers to make a roportion. In this case, therefore, you ust make a supposition twice, proceeding therein according to the tenor of the question. If neither of the supposed numbers solves the proportion, observe the errors, and whether they are greater or less than the supposition requires, and mark the errors accordingly with the sign + or —.

Then multiply contrariwise the one position by the other error; and if the errors are both too great or both too little, subtract the one product from the other, and divide the difference of the products by the difference of the errors. If the errors are unlike as the one + and the other —, add the products, and divide the sum thereof by the sum of the errors added together; for the proportion of the errors is the same with the proportion of the excesses or defects of the numbers supposed to be the numbers sought; or the suppositions and their errors being placed as before, work by this proportion as a general rule, viz. as the difference of the errors if alike, or their sum if alike, to the difference of the suppositions, so either error, to a fourth number; which accordingly added to or subtracted from the supposition against it, will answer the question.

POSITION, in geometry, is a term sometimes used in contradistinction to magnitude: thus, a line is said to be given in position, positione data, when its situation, bearing, or direction, with regard to some other line, is given; on the contrary, a line is given in magnitude when its length is given, but not its situation.

POSSESSION is two-fold, actual and in law. Actual possession is when a man actually enters into lands and tenements to him descended. Possession in law, is when the lands or tenements are descended to a man, and he has not as yet actually entered into them. *Staundf.* 198.

POST, a military station. Thus the detachments established in front of the army are termed out-posts; the stations on the wings of the army are said to be the posts of honour, as being the most conspicuous and most exposed. But in the operations of a campaign, a post properly signifies any spot of ground capable of lodging soldiers; or any situation, whether fortified or not, where a body of men may make a stand and engage the enemy to advantage. The great advantages of good posts, in carrying on war, as well as the mode of securing them, are only learned by experience. Barbarous nations disdain the choice of posts, or at least are contented with such as immediately fall in their way; they trust solely or chiefly to strength and courage: and hence the fate of a kingdom may be decided by the event of a battle. But enlightened and experienced officers make the choice of posts a principal object of attention. The use of them is chiefly felt in a defensive war against an invading enemy; as, by carrying on a war of posts in a country where this can be done to advantage, the most formidable army may be so harassed and reduced, that all its enterprises may be rendered abortive.

In the choice of a post, the general rules to be attended to are, that it should be convenient for sending out parties to reconnoitre, surprise, or intercept the enemy; that if possible it may have some natural defence, as a wood, a river, or a morass, in front or flank, or at least that it be difficult of access, and susceptible of speedy fortification; that it shall be so situated as to preserve a communication with the main army, and have covered places in the rear to favour a retreat; that it may command a view of all the approaches to it, so that the enemy cannot advance unperceived and rest concealed, while the detachment, stationed in the post are forced to remain under arms; that it is not commanded by any neighbouring heights; and proportioned in extent to the number of men who are to occupy and defend it. It is not to be expected that all these advantages will often be found united; but those posts ought to be selected which offer the greatest number of them.

POST, a conveyance for letters or dispatches.

The present establishment of the general post-office for Great Britain, consists of a postmaster-general, to the duties of which station there have, for many years past, been two persons appointed, under the title of joint postmasters-general; a secretary; upwards of 150 assistants and clerks for the head letter-office in London, under the direction of a superintending president of the inland letter department; and a comptroller of the foreign-letter office. Near 600 deputy-postmasters, throughout the kingdom, act under one principal and nine riding surveyors. There are also distinct offices and clerks, acting under an accountant-general and a receiver-general; as well as a separate establishment for the two-penny, formerly the penny-post, which, since the abolition of Mr. Palmer's appointment of surveyor and comptroller-general, has been new modelled and greatly improved in all its branches. There is likewise a post-master-general of Scotland, with a secretary, comptroller, surveyors, and a separate establishment of all the requisite officers and clerks at Edinburgh, acting under the orders of the joint postmasters-general in London. The annual expence of management is about 150,000*l* and the gross produce exceeds 700,000*l*. a year.

POST, *two penny*, a post established for the benefit of London, and other parts adjacent, whereby any letter or small parcel is speedily and safely conveyed to and from all places within the bills of mortality, or within ten miles of the city. It is now managed by the general post-office, and receiving-houses are established in most of the principal streets for the more convenient transmission of the letters.

POST, a particular mode of travelling. A person is said to travel post, in contradistinction to common journey travelling, when, in place of going on during his whole journey in the same vehicle, and with the same horses, he stops at different stages, to provide fresh horses or carriages, for the sake of greater convenience and expedition. As he thus uses the same mode of travelling that is employed for the common post, he is said to travel post, or in post, *i.e.* in the manner of a post.

POST DISSEISIN, a writ for him that having recovered land or tenements by præcipe quod reddat, upon default of reddition is again disseised by the former disseisor.

POSTEA, is the return of the proceedings by nisi prius into the court of common pleas after a verdict, and there afterwards recorded. *Plowd.* 211.

POSTERN, in fortification, is a small gate generally made in the angle of the flank of a bastion, or in that of the curtin, or near the orillon, descending into the ditch; by which the garrison may march in and out unperceived by the enemy, either to relieve the works, or to make private sallies, &c.

POSTULATE, in mathematics, &c., is described to be such an easy, and self-evident supposition, as needs no explication or illustration to render it intelligible; as, that a right line may be drawn from one point to another.

POTAMOGETON, *pond-weed*, a genus of the tetrandria tetragynia class of plants, the corolla whereof consists of four roundish, obtuse, hollow, patent, and unguiculated petals; there is no pericarpium; the seeds are four in number, roundish and accuminated, gibbous on one side, and compressed and angulated on the other. There are 14 species.

POTASS. If a sufficient quantity of wood is burnt to ashes, and these ashes afterwards washed repeatedly with water till it comes off free from any taste, and if this liquid is filtrated and evaporated to dryness, the substance which remains behind is potass; not, however, in a state of purity, for it is contaminated with several other substances, but sufficiently pure to exhibit many of its properties. In this state it occurs in commerce under the name of potash. When heated to redness, many of its impurities are burnt off; it becomes much whiter than before, and is then known in commerce by the name of pearl ash. Still, however, it is contaminated with many foreign bodies, and is itself combined with carbonic acid gas, which blunts all its properties.

POTATOE. See *Solanum*.

POTENT, or *Potence*, in heraldry, a term for a kind of a cross, whose ends all terminate like the head of a crutch.

POTENTILLA, *silver-weed*, *wild tansy*, or *cinquefoil*, a genus of the pentagynia order, in the icosandria class of plants, and in the natural method ranking under the 35th order senticosæ. The calyx is decemfid; there are five petals; the seeds roundish, naked, and affixed to a small dry receptacle. There are 32 species.

POTERIUM, *garden-burnet*, a genus of the polyandria order, in the monœcia class of plants, and in the natural method ranking under the 54th order, miscellaneæ. The male calyx is tetraphyllous; the corolla quadripartite; and there are from 30 to 40 stamina. The female calyx is tetraphyllous; the corolla quadripartite; there are two pistils; the berry is

f the indurated tube of the 'co-
here are five species.
OS, a genus of the polyandria
the gynandria class of plants.
ha or sheath is a simple spadix
; there is no calyx, but four pe-
as many stamina, the berries
ons.
ONE, a mineral found in nests
, and is always amorphous. Its
is often slaty; fracture undu-
oliated, greasy and brittle. Spe-
vity from 2.85 to 3.02. Colour
th a shade of green, sometimes
r yellow, sometimes leek green,
etimes speckled with red.
ERY, the manufacture of earth-
, or the art of making earthen
In a general sense, therefore, it
all the different branches.
CE, gum sandarach pounded
d very fine, to rub on paper, in
preserve it from sinking, and to
more fit to write upon. Pounce
little heap of charcoal dust, in-
a piece of muslin or some other
ff, to be passed over holes prick-
work, in order to mark the lines
ns on paper, silk, &c. placed
ath; which are to be afterwards
with a pen and ink, a needle,
ke.
D. See *Weight*.
D also denotes a money of ac-
so called because the antient
f silver weighed a pound troy.
ry.
SUIVANT, or *Pursuivant*, in he-
the lowest order of officers at
The poursuivants are properly at-
on the heralds, when they mar-
lic ceremonies.
ER, a dry medicine well broken,
a mortar, by grinding, or by che-
erations.
R, in mechanics, denotes any
ether of a man, a horse, a spring,
, water, &c. which being ap-
a machine, tends to produce mo-

R, in law, is an authority which
gives to another to act for him;
sometimes a reservation which
makes in a conveyance for him-
some acts, as to make leases or
2 *Lil. Abr.* 339. Thus power
ry, an instrument or deed where-
son is authorized to act for ano-
her generally, or in a specific
on.
R *of the county*, contains the aid
dance of all knights, gentlemen,
labourers, servants, apprentices,
others above the age of fifteen
hin the county.
r *Small-pox*. See *Medicine*.
ICE, or rules of practice, are
ompendious ways of working the
oportion, or golden rule.
PE, a writ commanding the de-
do the thing required, or to
se why he hath not done it.
UNIRE. This punishment is
pon him who denies the king's
y the second time; upon him
ins the authority of the pope,

or refuses to take the oath of supremacy: upon such as are seditious talkers of the inheritance of the crown; and upon such as affirm that there is any obligation by any oath, covenant, or engagement whatsoever, to endeavour a change of government either in church or state; or that both or either house or parliament have or has a legislative power without the king, &c. The judgment in præmunire at the suit of the king, against the defendant being in prison, is, that he shall be out of the king's protection; that his lands and tenements, goods and chattels shall be forfeited to the king; and that his body shall remain in prison at the king's pleasure; but if the defendant is condemned upon his default of not appearing, whether at the suit of the king or party, the same judgment shall be given as to the being out of the king's protection and the forfeiture: but instead of the clause that the body shall remain in prison, there shall be an award of a capiatur. *Co. Lit.* 129. Upon an indictment of a præmunire, a peer of the realm shall not be tried by his peers. 12 *Co*. 92.

PRAGMATIC *sanction*, in the civil law, is defined to be a rescript, or answer of the sovereign, delivered by advice of his council to some college, order, or body of people, upon consulting him on some case of their community. The like answer given to any particular person, is called simply rescript.

PRASIUM, in botany, a genus of the gymnospermia order, in the didynamia class of plants, and in the natural method ranking under the 42d order verticillatæ. There are four monospermous berries, and two species.

PRAYER, in theology, a petition put up to God, for the obtaining some future favour.

PREBENDARY, an ecclesiastic who enjoys a prebend. The difference between a prebendary and a canon is, that the former receives his prebend in consideration of his officiating in the church; but the latter merely by his being received into the cathedral or college.

PRECEDENCE, or *Precedency*, a place of honour to which a person is entitled: this is either of courtesy or of right. The former is that which is due to age, estate, &c. which is regulated by custom and civility: the latter is settled by authority, and when broken in upon gives an action at law.

PRECEPT, in law, a command in writing sent by a chief justice, justice of the peace, &c. for bringing a person, record, or other matter, before him.

Precept is also used for the command or incitement by which one man stirs up another man to commit felony, theft, &c.

PRECESSION, a very slow motion of the equinoxes.

PRECIPITATION, a process in chemistry, which is a separation whereby the particles of a body dissolved and suspended in any liquor, are detached from it and fall down to the bottom of the vessel.

PREDIAL *Tithes*, those which are paid

proves by the course of nature,
have been with child. 4 Black. 39

PREHNITE, a mineral of the fl
cies.

PREMISSES, is that part of the be
of a deed, the office of which is
press the grantor and grantee,
land or thing granted.

PREMNA, a genus of the did
angiospermia class and order. The
two-lobed; corolla four-cleft;
four-celled; seeds solitary. Th
two species.

PRENANTHES, in botany, a g
the polygamia æqualis order, in t
genesia class of plants, and in the
method ranking under the 49th
compoitæ. The receptacle is nak
calyx calyculated; the pappus is
and almost sessile; the florets are
in a single series. There are 19 s
some of them natives of England.

PREROGATIVE, is a word of
extent, including all the rights and
leges which by law the king has a
of the commonwealth, and as in
with the execution of the laws.
Abr. 149.

PREROGATIVE COURT; the
wherein all wills are proved, and
ministrations taken which belong
archbishop by his prerogative; tha
case where the deceased had g
any considerable value out of th
cese wherein he died; and that va
ordinarily 5*l*, except it is otherw
composition between the said arch
and some other bishop, as in the
of London it is 10*l*.

PRESBYTERIANS, a numerou
highly respectable sect of protesta
called from their maintaining that
vernment of the church appointed
NewTestament was by presbyterie
is, by ministers and ruling elders,
ciated for its government and disci

ing, the second rolling press-printing, ord calico, &c. printing; and the tereotype printing.

ISM, in geometry, an oblong solid ined under more than four planes, e bases are equal, parallel, and alike ted.

ISM, in dioptrics, a triangular glass s, much used in experiments on the re of light and colour.

ISON, a gaol, or place of confine-

ISTIS, or saw-fish, a genus of fishes of order chondropterigii: the generic cter is, snout long, flat, spinous down dges, spiracles lateral; body oblong, dish, covered with a rough, coriace- kin; mouth beneath; nostrils before nouth, half-covered with a mem- aceous flap; behind the eyes two orifices; ventral fins approximate. e are five species.

IVILEGE, in law, some peculiar be- granted to certain persons or pla- contrary to the usual course of the

IVY, in law, denotes one who is ker, or has an interest, in an affair.

IVY COUNCIL, is the principal cil belonging to the king, and is ge- lly called by way of eminence the cil.

IVY SEAL, is a seal that the king to such grants, or other things, as pass reat seal.

IZE or *prise*, in maritime affairs, a el taken at sea from the enemies of a , or from pirates; and that either by a of war, a privateer, &c. having a nission for that purpose. Vessels ooked on as prize, if they fight un- ny other standard than that of the from which they have their commis- ; if they have no charter-party, in- , or bill of lading, aboard: if loaded effects belonging to the king's ene- , or with contraband goods. Those king's subjects recovered from the y, after remaining twenty-four hours ir hands, are deemed lawful prize. els that refuse to strike, may be rained; and if they make resistance ight, become lawful prize if taken. ips of war, the prizes are to be di- among the officers, seamen, &c. as ajesty shall appoint by proclamation; mong privateers, the division is ac- ng to the agreement between the ers. By stat. 13 Geo. II. c. 4, s and officers, failing of their duty pect to the condemnation of prizes, five hundred pounds, with full of suit: one moiety to the king, and ther to the informer.

OBATE of *wills* is the exhibiting proving wills and testaments before clesiastical judges.

OBE, a surgeon's instrument for ining the circumstances of wounds,

OBLEM, in logic, a proposition that er appears absolutely true nor false, consequently may be asserted ei- n the affirmative or negative.

OBLEM, in geometry, is a proposition ein some operation or construction is required; as to divide a line or angle, erect or let fall perpendiculars.

PROBLEM, in algebra, is a question or proposition, which requires some unknown truth to be investigated, and the truth of the discovery demonstrated.

PROBLEMATICAL *resolution*, in algebra, a method of solving difficult questions by certain rules, called canons.

PROBOSCIS, in natural history, is the trunk or snout of an elephant, and some other beasts and insects.

PROCEDENDO is a writ which lies where a cause is removed out of an inferior to a superior court.

PROCELLARIA, in ornithology; a genus of birds, belonging to the order of anseres. The beak is somewhat compressed, and without teeth; the mandibles are equal, the superior one being crooked at the point; the feet are palmated, the hind claw being sessile without any toe. Mr. Latham enumerates twenty-four species.

PROCESS, is the manner of proceeding in every cause, being the writs and precepts that proceed or go forth upon the original in every action, being either original or judicial.

PROCKIA, a genus of the polyandria monogynia class and order. The cal. is three-leaved; cor. none; berry five-cornered, many-seeded. There is one species, a shrub of Santa Cruz.

PROCLAMATION, a public notice given of any thing of which the king thinks proper to advertise his subjects.

PROCTOR, a person commissioned to manage another person's cause in any court of the civil or ecclesiastical law.

PROCURATOR, a person who has a charge committed to him to act for another.

PROCYON, in astronomy, a fixed star of the second magnitude in the constellation called canis minor.

PRODUCING, in geometry, signifies the drawing out a line farther till it has any assigned length.

PRODUCT, in arithmetic and geometry, the factum of two or more numbers, or lines, &c. into one another: thus $5\times4=20$ the product required.

PROFILE, the draught of a building, fortification, &c. See *Architecture*.

PROFILE also denotes the outline of a figure, building, member of architecture, &c.

PROFILE, in sculpture and painting, denotes a head, portrait, &c. when represented sideways, or in a side view.

PROGRESSION, an orderly advancing or proceeding in the same manner, course, tenor, proportion, &c.

Progression is either arithmetical, or geometrical.

Arithmetical progression, is a series of quantities proceeding by continued equal differences, either increasing or decreasing. Thus,

increasing 1, 3, 5, 7, 9, &c. or
decreasing 21, 18, 15, 12, 9, &c.

where the former progression increases continually by the common difference 2, and the latter series or progression de-

Or ascending, a, ra, r^2a, r^3

or descending, $a, \frac{a}{r}, \frac{a}{r^2}, \frac{a}{r^3}$

PROHIBITION, is a writ pr
suing only out of the court of kin
being the king's prerogative v
for the furtherance of justice, it
also be had in some cases out of
of chancery, common pleas, or e
directed to the judge and partie
in an inferior court, commandin
cease from the prosecution there
a suggestion, that either the case
ally, or some collateral matte
therein, does not belong to that
tion, but the cognizance of so
court. Upon the court being sati
the matter alleged by the sug
sufficient, the writ of prohibitio
diately issues.

PROJECTILES, are such bodi
ing put in a violent motion by a
force, are then cast off or let go
place where they received their
of motion; as a stone thrown fro
an arrow from a bow, a bullet fro
&c.

PROJECTION, in mechanics,
of giving a projectile its motion.

PROJECTION, in perspective,
the appearance or representati
object on the perspective plane.

PROJECTION *of the Sphere* i
is a representation of the several
places of the surface of the sphe
of the circles described upon it,
transparent plane placed betw
eye and the sphere, or such as the
to the eye placed at a given distan

PROJECTION *orthographic*, is
which the surface of a sphere i
upon a plane, cutting it in the
the eye being placed at an infin
tance vertically to one of the hemi
And

PROJECTION *stereographic* of the

a foreign bill of exchange de-
at such bill is dishonoured.

EST, is also that act of a master,
rrival with his ship from parts be-
seas, to save him and his owners
s and indemnified from any da-
stained in the goods of her lading,
unt of storms.

ESTANT, a name first given in
y to those who adhered to the doc-
Luther; because in 1529, they
d against a decree of the emperor
V. and the diet of Spires; declar-
they appealed to a general coun-
e same name also has been given
of the sentiments of Calvin, and
become a common denomina-
all those of the reformed churches.

EA, the *silver-tree*, a genus of the
nia order, in the tetrandria class of
nd in the natural method ranking
e 47th order, stellatæ. There is
drifid petal surrounding the germ;
no proper calyx; the receptacle
ceous. There are sixty-four spe-

HONOTARY, a term which pro-
gnifies first notary, and which was
the title of the principal nota-
he emperors of Constantinople.
otary with us is used for an officer
urts of king's bench and common
he former of which courts has one,
latter three. The prothonotary of
g's bench records all civil actions
that court, as the clerk of the
office does all criminal causes.
thonotaries of the common pleas
d inrol all declarations, plead-
ssizes, judgments and actions;
o make out all judicial writs,
writs of habeas-corpus, and dis-
jurator, for which there is a parti-
ffice, called the habeas corpora
they likewise enter recognizances
ledged, and all common recove-
ake exemplifications of records, &c.

OXIDE, in chemistry, a term used
e the minimum of oxidizement.

RACTION, the same with plot-

RACTOR, the name of an instru-
ed for protracting or laying down
er the angles of a field, or other

IDENCE, the conduct and di-
of the several parts of the uni-
y a superior intelligent being.

INCE, the circuit of an arch-
jurisdiction.

ISO, in law, a condition inserted
ed, upon the observance whereof
dity of the deed depends.

OST, an officer, whereof there
ers kinds, civil, military, &c.

OST of a city or town, is the
unicipal magistrate in several
cities, particularly Edinburgh,
, &c. being much the same with
other places.

OST *marshal of an army*, is an
ppointed to seize and secure de-
and all other criminals. He is
r soldiers from pillaging, to indict
rs, and see the sentence passed
n executed. He also regulates
ghts and measures, and the
provisions, &c. in the army.

PROW, in navigation, denotes the head or fore part of a ship, particularly in a galley, being that which is opposite the poop or stern.

PRUNELLA, self-hue, a genus of the gymnospermia order, in the didynamia class of plants; and in the natural method ranking under the 12th order, holoraceæ. The filaments are bifurcated, with an anthera only on one point; the stigma is bifid. There are three species.

PRUNELLÆ, *sal*, a preparation of purified saltpetre.

PRUNES, are plums dried in the sunshine, or in an oven.

PRUNING, in gardening and agriculture, is the lopping off the superfluous branches of trees, in order to make them bear better fruit, grow higher, or appear more regular. Pruning, though an operation of very general use, is nevertheless rightly understood by few; nor can it be learned by rote, or, indeed, wholly by books, but requires a strict observation of the different manners of growth of the several sorts of fruit trees; the proper method of doing which cannot be known, without carefully observing how each kind is naturally disposed to produce its fruit; for some do this on the same year's wood as vines; others, for the most part, upon the former year's wood, as peaches, nectarines, &c. and others, upon spurs which are produced upon wood of three, four, &c. to fifteen or twenty years old, as pears, plumbs, cherries, &c. therefore, in order to the right management of fruit trees, provision should always be made to have a sufficient quantity of bearing wood in every part of the trees, and at the same time there should not be a superfluity of useless branches, which would exhaust the strength of the trees, and cause them to decay in a few years. The reasons for pruning of fruit-trees, are, 1. To preserve them longer in a vigorous bearing state; 2. To render them more beautiful; and, 3. To cause the fruit to be larger and better tasted.

PRUNUS, a genus of the monogynia order, in the icosandria class of plants; and in the natural method ranking under the 35th order, pomaceæ. The calyx is quinquefid, inferior; there are five petala; the fruit is a plum, having a kernel with prominent sutures. There are thirty-three species.

PRUSSIC *acid*, in chemistry and the arts, is one of the most important of the acids. It was discovered by accident about the beginning of the last century by Diesbach, a chemist of Berlin. This gentleman, wishing to precipitate a decoction of cochineal with an alkali, got some potash on which he had distilled several times his animal oil, and as there was some sulphate of iron in the decoction, the liquor instantly exhibited a beautiful blue in the place of a red precipitate. Hence he saw the method of producing the same substance at pleasure, and it soon became an object of commerce, and obtained the name of Prussian blue, from the place where it was discovered. This substance is now formed, chiefly, during the decomposition of animal substances in high temperatures. Three parts of blood, evaporated to dryness in an

tion add one composed of
and one of sulphate of iro
of boiling water, and conti
as long as any effervesce
pitation ensues. Wash
several times with boiling
have a green colour; but,
of a quantity of muriatic
twice that of the sulphate o
been used, it will assume
colour. Wash it again
dry it in a gentle heat.
the pigment, called *Pruss*
consists of a mixture of p
with alumine. From pr
the prussic acid may be
following process: mix
red oxide of mercury, pre
acid, with four ounces of fi
Prussian blue, and boil
with twelve ounces of w
vessel, shaking frequentl
solution, which is a pru
cury, while hot, and when
in a bottle, two ounces of i
six or seven drachms of s
shake these together, deca
quor into a retort, and dist
of the liquor. The distille
prussic acid, which combin
and earths, and has many o
belonging to the other ac
sweetish taste, and a sm
that of bitter almonds; it d
blue vegetable colours.
sulphurets, and curdles soa
alumine from nitric acid.
muriatic acid entirely deco
does not appear to have a
for alkalies, nor does it ta
carbonic acid, for no efferv
on adding it to a solution o
bonates; on the contrary, its
with alkalies and earths ar

and solitary. There are six

A, a genus of the polygamia
r, in the syngenesia class of
n the naturalmethod ranking
h order, compositæ. The re-
of multipartite bristles; the
le plump; the calyx imbrica-
are 18 species, shrubs of the

ROSPERMUM, a genus of the po-
order, in the monadelphia class
and in the natural method rank-
under the 37th order, columniferæ.
calyx is quinquepartite; the corolla
of five oblong spreading petals.
filaments are about fifteen, which
towards the base into a tube. The
is cylindrical; the capsule is oval,
y, and quinquelocular, each of which
bivalved, containing many oblong,
pressed, and winged seeds. There
two species.

TEROTRACHEA, a genus of the ver-
mollusca. Body detached, gelatinous
a moveable fin at the abdomen or
; eyes two, placed within the head,
e are four species.

INUS, a genus of insects belonging
order coleoptera. The generic cha-
r is, antennæ filiform, with the three
oints largest; thorax roundish, with-
istinct margin, receiving occasional-
head.

OLEMAIC, or *Ptolemean system of*
omy, is that invented by Claudius
mæus, a celebrated astronomer and
matician of Pelusium in Egypt,
ved in the beginning of the second
ry of the Christian æra. This hypo-
supposes the earth immoveably fix-
the centre, not of the world only,
so of the universe; and that the
e moon, the planets, and stars, all
about it from east to west, once in
rs, in the order following, viz. the
next to the Earth, then Mercury,
, the Sun, Mars, Jupiter, Saturn,
ced stars, the first and second crys-
heavens, and above all the fiction of
r primum mobile.

LEX, the *flea*, a genus of insects of
der aptera. The generic character
s six, formed for leaping; eyes two;
næ filiform; mouth furnished with
lected, setaceous snout, concealing
cer; abdomen compressed.

LLEY, one of the mechanical pow-
alled by seamen, a tackle.

LMONARIA, *lungwort*, a genus of
onogynia order, in the pentandria
of plants, and in the natural method
ng under the 41st order, asperifoliæ.
corolla is funnel-shaped, with its
pervious; the calyx is prismatic
ntagonal. There are seven species.

SE, in the animal economy, de-
the beating or throbbing of the
and arteries.

LTENÆA, a genus of the class and
decandria monogynia. The calyx
e-parted; corolla papilionaceous;
e one cell, two-seeds. There are
ecies

ICE-STONE, or *porous glasses.*
the compact glasses are exposed to
st of our furnaces, they emit a great
numberof air-bubbles, which renders them porous; such is the origin of pumice. It has the same base as compact glass. The texture is fibrous; the fibres have a silky lustre. Colours various; white, brown, yellow, black. Before the blowpipe, they melt into a white enamel.

PUMP, an hydraulic machine for raising water by means of the pressure of the atmosphere.

Air-PUMP. See *Pneumatics.*

PUNCHEON, a little block or piece of steel, on one end whereof is some figure, letter, or mark, engraved either in creux or relievo, impressions of which are taken on metal, or some other matter by striking it with a hammer on the end not engraved. There are various kinds of these puncheons used in the mechanical arts; such for instance are those of goldsmiths, cutlers, pewterers, &c.

PUNCHEON, in carpentry, is a piece of timber placed upright between two posts, whose bearing is too great, serving, together with them, to sustain some large weights. This term is also used for a piece of timber raised upright, under the ridge of a building, wherein the little forces, &c. are jointed.

PUNCHEON is also used for the arbor, or principal part of a machine, whereon it turns vertically, as that of a crane, &c.

PUNCHEON is also a measure for liquids, containing a hogshead and one-third, or eighty-four gallons.

PUNICA, the *pomegranate tree*, a genus of the monogynia order, in the icosandria class of plants, and in the natural method, ranking under the 39th order, pomaceæ. The calyx is quinquefid, superior: there are five petals; the fruit is a multilocular and polyspermous apple.

PURCHASE, in law, the buying or acquiring of lands, &c. with money, by deed or agreement and not by descent or right of inheritance. A joint purchase is when two or more persons join together in the purchase.

PURCHASE, in the sea-language, is the same as draw in: thus when they say the capstan purchases apace, they only mean it draws in the cable apace.

PURITAN, a name formerly given in derision to the dissenters from the church of England, on account of their professing to follow the pure word of God, in opposition to all traditions and human constitutions.

PURLINS, in building, those pieces of timber that lie across the rafters on the inside, to keep them from sinking in the middle of their length.

PURPLE, a colour composed of a mixture of red and blue.

PURSER, an officer aboard a man of war, who receives her victuals from the victualler, sees that it is well stowed, and keeps an account of what he every day delivers to the steward. He also keeps a list of the ship's company, and sets down exactly the day of each man's admission, in order to regulate the quantity of provisions to be delivered out; and that the paymaster or treasurer of the navy may issue out the disbursements, and pay off the men, according to his book.

thorny legumen and two seeds, the le
oval and pinnated, and the stem arn

PUTTY, in the arts. When tin is me
in an open vessel, its surface soon beco
covered with a grey powder, which i
oxide of the metal. If the heat is
tinued, the colour of the powder grad
ly changes, and at last becomes yel
In this state it is known by the n
of putty, and employed in polishing
and other hard-substances.

PUTTY is also a kind of paste c
pounded of whiting and linseed
beaten together to the consistence
thick dough.

PUZZULANA or *Pozzolana terra*
terras, is a greyish kind of earth use
Italy for building under water.

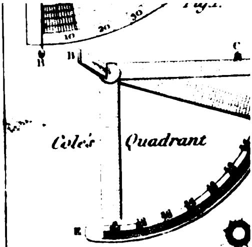
PYRAMID, in geometry, a solid st
ing on a triangular, square, or polyg
basis, and terminating in a point a
top; or according to Euclid, it is a
figure, consisting of several trian
whose bases are all in the same pl
and which have one common vertex.

PYRAMID, in architecture, a
massive building, which from a squ
triangular, or other base, rises dimi
ing to a vertex or point.

Pyramids are sometimes used to
serve the memory of singular eve
and sometimes to transmit to post
the glory and magnificence of pri
But as they are esteemed as a symb
immortality, they are most comm
used as funeral monuments. Such
that of Cestius of Rome, and those

Q, or q, the sixteenth letter of ou
alphabet. As a numeral it st

Fig. 1.



Cole's Quadrant

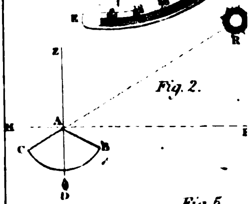


Fig. 2.

Fig. 5.

Gunner's Quadrant

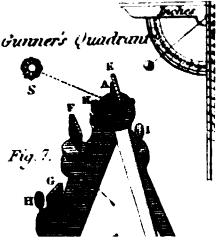


Fig. 7.

RANT, in geometry, is either
er or fourth part of a circle, [illegible]
part of its circumference: [illegible]
which therefore contains [illegible] de-

RANT also denotes a mathema-
ument, of great use in astronomy
gation, for taking the altitudes of
nd stars, as also taking angles
ing, heights, and distances, &c.
ncipal and most useful quadrants
lows:

RANT, *the common, or surveying*
ument ABC, fig. 1. Plate Qua-
made of brass, or wood, &c.;
or arch of which BC is divided
g. and each of these is farther
into as many equal parts as the
ll allow, either diagonally or
. To one of the radii AC are
o moveable sights; and [illegible]
sometimes also annexed a label,
ble index, AD, bearing two other
ut instead of these last sights,
sometimes fitted a [illegible]
the centre hangs a thread with
et; and on the under side or
e instrument are fitted a [illegible]
ct, by means of which it may
any position. The general use
for taking angles in a vert[illegible]
mprehended under right lines
m the centre of the instrument,
[illegible] zontal, and the other
d to some visible point. But bes[illegible]
parts above described, there is
ed on the face, near the centre,
[illegible], or men [illegible], called a qua-
geon [illegible] square, which is a
parate instrument, and is [illegible]
useful in [illegible]
r measuring [illegible]

[illegible]

[illegible] by the degrees [illegible]
quadrant. Thus [illegible]
taking an [illegible]
[illegible]
e instrument [illegible]
centre [illegible]
[illegible]
the angle [illegible]
[illegible]
the angle [illegible]
e and the [illegible]

[illegible]

it from bending or warping. The quadrant [illegible] is also of wood, and divided into [illegible] grees and half parts of degrees, to a radius of about nine inches, and to its extremities are fitted two [illegible], which meet in the centre of the quadrant by a pin, about which it easily moves. The sight-vane A is a thin piece of brass, near two inches in height and one broad, set perpendicularly on the end of the [illegible] A, by means of two screws passing through its foot. In the middle of this vane is drilled a small hole, through which the coincidence or meeting of the horizon and solar spot is to be viewed. The horizontal vane B is about an inch broad, and two inches and a half high, having a slit cut through it, of near an inch long, and a quarter of an inch broad; this vane is fixed in the centre-pin of the instrument, in a perpendicular position, by means of two screws passing through its foot, by which its position will [illegible] to the sight-vane [illegible] angle of [illegible] degrees. The shade-vane C [illegible] a brass plate [illegible] arm, is about 4½ inches long [illegible] an inch broad; [illegible] to the upper [illegible] quadrant [illegible] screw, about which it [illegible]. The other end lies in the [illegible] lower edge of the arm [illegible] middle of the [illegible] plate, which [illegible]

[illegible]

[illegible] *latitude* [illegible]

[illegible] and [illegible] is seen [illegible] towards the [illegible]

[illegible] the observer [illegible]

[illegible]

upon them; and the two horizons are drawn from the same point. The limb is divided both into degrees and time; and by having the sun's altitude, the hour of the day may here be found to a minute. The quadrantal arches next the centre contain the calendar of months; and under them, in another arch, is the sun's declination. On the projection are placed several of the most remarkable fixed stars between the tropics, and the next below the projection are the quadrant and line of shadows.

To find the time of the sun's rising or setting, his amplitude, his azimuth, hour of the day, &c. by this quadrant. Lay the thread on the day of the month, and bring the bead to the proper ecliptic, either of summer or winter, according to the season, which is called rectifying; then by moving the thread, bring the bead to the horizon, in which case the thread will cut the limb in the point of the time of the sun's rising of setting before or after 6; and at the same time the bead will cut the horizon in the degrees of the sun's amplitude. Again, observing the sun's altitude with the quadrant, and supposing it found to be 45 deg. on the 5th of May, lay the thread over the 5th of May, then bring the bead to the summer ecliptic, and carry it to the parallel of altitude 45 deg. in which case the thread will cut the limb at 55 deg. 15 min. and the hour will be seen among the hour-lines to be either 41 min. past 9 in the morning, or 19 min. past 2 in the afternoon. Lastly, the bead shews among the azimuths the sun's distance from the south 50 deg. 41 min.

But if the sun's altitude is less than what it is at 6 o'clock, the operation must be performed among those parallels above the upper horizon; the bead being rectified to the winter ecliptic.

QUADRANT, *gunner's*, fig. 5, sometimes called the gunner's square, is used for elevating and pointing cannon, mortars, &c. and consists of two branches, either of wood or brass, between which is a quadrantal arch divided into 90 deg.

: quadrant consists of an arc BC,
y attached to two radii or bars, AB,
which are strengthened and bound
ier by the two braces LM.

: index D is a flat bar of brass that
on the centre of the octant. At the
' end of the index there is an oblong
ing : to one side of this opening a
er is fixed, to subdivide the divi-
of the arc ; at the bottom or end of
idex there is a piece of brass, which
s under the arc, carrying a spring to
the vernier lie close to the divi-
: it is also furnished with a screw to
he index in any desired position.
'ernier.

e circular arcs on the arc of the qua-
. are drawn from the centre on which
idex turns ; the smallest excentri-
n the axis of the index would be
ictive of considerable errors.

: position of the index on the arc
an observation, points out the num-
f degrees and minutes contained in
served angle.

un the index E, and near its axis, is
a plain speculum, or mirror of glass,
silvered. It is set in a brass frame,
s placed so that the face of it is per-
.cular to the plane of the instrument;
iirror being fixed to the index, moves
: with it, and has its direction
ged by the motion thereof.

s glass is designed to receive the
e of the sun, or any other object, S,
eflect it upon either of the two hori-
glasses F and G, according to the na-
of the observation.

e brass frame with the glass is fixed
: index by the screw C ; the other
r serves to replace it in a perpendi-
' position, if by any accident it has
deranged.

e index-glass is often divided into
parts, the one silvered, the other
: with a small screen in front. A sin-
black surface has indeed some ad-
ages ; but if the glasses are well se-
ct, there is little danger to be ap-
ended of error from a want of paralle-
n ; more is to be feared from the
ices not being flat.

the radius AB of the octant, are two
l speculums F and G. The surface
e upper one is parallel to the index-
, when the index counting division
e index is at 0 on the arc, but the sur-
of the lower one is perpendicular to
ndex glass, when the index is at 0
ees on the arc ; these mirrors re-
: the reflected rays from the ob-
and transmit them to the observer.

e horizon-glasses are not entirely
silvered ; the upper one F, is only
red on its lower part, or that half
the quadrant, the other half being
sparent ; and the back part of the
e is cut away, that nothing may im-
the sight through the unsilvered part
e glass. The edge of the foil of this
is nearly parallel to the plane of the
ument, and ought to be very sharp,
without a flaw.

ie other horizon-glass G, is silvered
the ends ; in the middle there is a
sparent slit, through which the hori-
or other object, may be seen.

ch of these glasses is set in a brass
e, to which there is an axis, this axis
passes through the wood-work, and is fitted to a lever on the under side of the quadrant ; by this lever the glass may be turned a few degrees on its axis, in order to set it parallel to the index-glass. The lever has a contrivance to turn it slowly, and a button to fix it. To set the glasses perpendicular to the plane of the quadrant, there are two sunk screws, one before and one behind each glass ; these screws pass through the plate on which the frame is fixed, into another plate ; so that by loosening one and tightening the other of these screws, the direction of the frame with its mirror may be altered, and thus be set perpendicular to the plane of the instrument.

There are two red or dark glasses, and one green one K ; they are used to prevent the bright rays of the sun, or the glare of the moon, from hurting the eye at the time of observation. They are each of them set in a brass frame, which turns on a centre ; so that they may be used separately, or together, as the brightness of the sun may require. The green glass may be used also alone, if the sun is very faint ; it is also used for taking the altitude of the moon, and in ascertaining her distance from a fixed star.

When these glasses are used for the fore observation, they are fixed as at K ; when used for the back observation, they are removed to N.

Each of the vanes H and I, is a perforated piece of brass, designed to direct the sight parallel to the plane of the quadrant. That which is fixed at I is used for the fore, the other for the back observation.

The vane I has two holes : one exactly at the height of the quicksilvered edge of the horizon-glass ; the other somewhat higher, to direct the sight to the middle of the transparent part of the mirror, for those objects which are bright enough to be reflected from the unsilvered part of the mirror.

Directions to hold the instrument. It is recommended to support the weight of the instrument by the right hand, and reserve the left to govern the index. Place the thumb of the right hand against the edge of the quadrant, under the swelling part of which the fore-sight I stands, extending the fingers across the back of the quadrant, so as to lay hold on the opposite edge, placing the fore finger above, and the other fingers below the swelling part, or near the fore horizon-glass ; thus you may support the instrument conveniently, in a vertical position, by the right hand only ; by resting the thumb of the left hand against the side, or the fingers against the middle bar, you may move the index gradually either way.

In the back observation, the instrument should be supported by the left hand, and the index be governed by the right.

Of the two objects which are made to coincide by this instrument, the one is seen directly by a ray passing through, the other by a ray reflected from the same point of the horizon-glass to the eye. This ray is called the visual ray ; but when it is considered merely as a line drawn from the middle of the horizon-glass to the eye hole of the sight vane, it is called the axis of vision.

brought parallel to the plane of the quadrant, so that by bringing the object to the middle between them, you are certain of having the axis of vision parallel to the plane of the quadrant.

Of the observations. There are two sorts of observations to be made with this instrument: the one is when the back of the observer is turned towards the object, and therefore called the back observation; the other when the face of the observer is turned towards the object, which is called the fore observation.

To rectify the instrument for the fore observation. Slacken the screw in the middle of the handle behind the glass F; bring the index close to the button k; hold the instrument in a vertical position with the arch downwards, look through the right hand hole in the vane I, and through the transparent part of the glass F, for the horizon; and if it lies in the same right line with the image of the horizon seen on the silvered part, the glass F is rightly adjusted; but if the two horizontal lines disagree, turn the screw which is at the end of the handle backward or forward, till those lines coincide, then fasten the middle screw of the handle, and the glass is rightly adjusted.

To take the sun's altitude by the fore observation. Having fixed the screens above the horizon-glass F, and suited them proportionally to the strength of the sun's rays, turn your face towards the sun, holding the instrument with your right hand, by the braces L and M, in a vertical position, with the arch downward; put your eye close to the right-hand hole in the vane I, and view the horizon through the transparent part of the horizon-glass F, at the same time moving the index D with the left hand, till the reflex solar spot coincides with the line of the horizon; then the degrees counted from that end next your body, will give the sun's altitude at that time, observing to add or subtract 16 minutes according as the upper or lower edge of the sun's reflex image is made use of.

But to get the sun's meridian altitude,

TABLE I. Dip of the horizon of the sea.			TABLE II. Refractions of the stars, &c. in altitude.					
Height of the eye.	Dip of the horizon.		Appar. altit. in deg.	Refraction.		App. alt. in deg.	Refraction.	
Feet.	'	"	°	'	"	°	'	"
1	0	57	0	33	0	11	4	47
2	1	21	¼	30	35	12	4	23
3	1	39	½	28	22	15	3	30
5	2	8	1	24	29	20	2	35
10	3	1	2	18	35	25	2	2
15	2	42	3	14	36	30	1	38
20	4	16	4	11	51	35	1	21
25	4	46	5	9	54	40	1	8
30	5	14	6	8	29	45	0	57
35	5	39	7	7	20	50	0	48
40	6	2	8	6	29	60	0	33
45	6	24	9	5	48	70	0	21
50	6	44	10	5	15	80	0	10

les for these corrections. 1. In
ervations, add the sum of both
to the observed zenith dis-
the true zenith distance; or
said sum from the observed
the true one. 2. In the back
, add the dip and subtract the
for altitudes; and for zenith
o the contrary, viz. subtract the
l the refraction.

By a back observation, the
he sun's lower edge was found
quadrant to be 25 deg. 12
e being 30 feet above the ho-
the tables, the dip on 30 feet
4 sec., and the refraction on
min. is 2 min. 1 sec. Hence

	deg.	min.	sec.
lower limb	25	12	0
diameter, sub.	0	16	0
of centre	24	56	0
on, add	0	5	14
	25	1	14
subtract	0	2	1
f centre	24	59	13

se of the moon, besides the
tions above, another is to be
r parallaxes. But of all these
, see the requisite tables of the
manac; also Robertson's Na-
vol. 2, p. 340, &c. edit. 1780.
l quadrant is one of some use
on. It consists of several con-
adrantal arches, divided into
parts by means of radii, with
ght lines crossing each other at
s. Now any one of the arches,
B, in the plate, may represent
t of any great circle of the
t is chiefly used for the horizon
n. If then BC is taken for a
f the horizon, either of the
B, may represent the meridian,
her side AC will represent a
or line of east and west; all
lines parallel to, AB, will be
lians; and all those parallel to
and west lines, or parallels.

Again, the eight species into which the arches are divided by the radii, represent the eight points of the compass in a quarter of the horizon; each containing 11 deg. 15 min. The arch BC is likewise divided into 90 deg., and each degree subdivided into 12 min., diagonalwise. To the centre is fixed a thread, which being laid over any degree of the quadrant, serves to divide the horizon.

If the sinical quadrant is taken for a fourth part of the meridian, one side of it AB may be taken for the common radius of the meridian and equator; and then the other, AC, will be half the axis of the world. The degrees of the circumference BC will represent degrees of latitude; and the parallels to the side AB assumed from every point of latitude to the axis, AC, will be radii of the parallels of latitudes, as likewise the cozine of those latitudes.

Hence, suppose it is required to find the degrees of longitude contained in 83 of the lesser leagues in the parallel of 48 deg.; lay the thread over 48 deg. of latitude on the circumference, and count thence the 83 leagues on AB, beginning at A; this will terminate in H, allowing every small interval four leagues. Then tracing out the parallel HE, from the point H to the thread, the part A E of the thread shews that 125 greater or equinoctial leagues make 6 deg. 15 min.; and therefore that the 83 lesser leagues AH, which make the difference of longitude of the course, and are equal to the radius of the parallel HE make 6 deg. 15 min. of the said parallel.

When the ship sails upon an oblique course, such course, beside the north and south greater leagues, gives lesser leagues easterly and westerly, to be reduced to degrees of longitude of the equator. But these leagues being made neither on the parallel of departure, nor on that of arrival, but on all the intermediate ones, there must be found a mean proportional parallel between them. To find this, there is on the instrument a scale of cross latitudes. Suppose then it were required to find a mean parallel between the parallels of 40 deg. and 60

making an angle of 33 deg. 45
the north part of the meridian;
given the course and distance
which a triangle may be forme
instrument similar to that mac
ship's course; and hence the
parts of the triangle may be fou
supposing the centre A to repr
place of departure, count by
the concentric circles along the
ship sailed on, viz. AAD, 150
then in the triangle AED, simila
of the ship's course, find AE = d
of latitude, and DE = differenc
gitude, which must be reduced
ing to the parallel of latitude con

QUADRANT *of altitude* is an a
to the artificial globe, consisting
slip of brass, the length of a quar
of one of the great circles of th
and graduated. At the end, w
division terminates, is a nut riv
and furnished with a screw, by
which the instrument is fitted on
ridian, and moveable round upo
ver to all points of the horizon.
is to serve as a scale in measu
altitudes, amplitudes, azimuths,

QUADRANTAL, in Roman an
a vessel every way square like
serving as a measure of liquids
pacity was eighty libræ or pounds
ter, which make 48 sextaries, two
or eight congii.

QUADRAT, a mathematical
ment, called also a geometrical
and line of shadows; it is frequen
additional member on the face o
common quadrant, as also on th
Gunter's and Sutton's quadrant.

QUADRAT, in printing, a piece of
tal cast like the letters, to fill up the
spaces between words, &c. Ther
m quadrats, *n* quadrats, &c. whic
respectively of the dimensions of
letters.

QUADRATIC EQUATION

RTER, the fourth part of any thing
ctional expression for which ¼.
r, in weights, is generally used for
urth part of a hundred weight
upois, or 28lb.
d as the name of a dry measure,
r is the fourth part of a ton in
t, or eight bushels.

RTER, in heraldry, is applied to the
r members of the first division of
that is quartered or divided into
arters.

RTER *of a point*, in navigation, is
urth part of the distance between
rdinal points, which is 2 deg. 48.

RTER *of a ship*, is that part of a
hold which lies between the steer-
om and the transom.

RTER-MASTERS, or *quarteers*, in a
war, are officers whose business it
mmage, stow, and trim, the ship
hold; to overlook the steward in
ivery of victuals to the cook, and in
ng or drawing out beer, or the
They are also to keep their watch
n conning the ship, or any other

RTERING, in gunnery, is when a
of ordnance is so traversed that it
oot on the same line, or on the same
of the compass, as the ship's quarter

RTERING, in heraldry, is dividing
into four or more quarters, or qua-
, by parting, couping, &c. that is,
rpendicular and horizontal lines,

RTERS, a name given at sea to
everal stations where the officers
rew of a ship of war are posted in
.

RTZ, a mineral of the flint genus,
is divided into five sub-species:
e amethyst, the rock crystal, milk-
t, common quartz and prase.

ASSIA, a genus of the monogynia or-
the decandria class of plants, and
natural method ranking under the
rder, gruinales. The calyx is pen-
llous; there are five petals; the
ium is pentaphyllous; there are
two to five seed-cases, standing
er, and monospermous. There are
species, the amara, simaruba, and
a.

EEN, a woman who holds a crown
. The title of queen is also given by
f courtesy to her that is married to a
who is called by way of distinction
-consort.

ERCUS, the *oak-tree*, a genus of the
ndria order, in the monoecia class of
s, and in the natural method ranking
the 50th order, amentaceæ. The
is nearly quinquefid; there is no
a; the stamina are from five to ten
mber. The female calyx is mono-
ous, very entire, and [illegible].
is no corolla; the styles are from
o five, and there is an oval seed.
are 25 species.

ERIA, a genus of the trigynia order,
triandria class of plants, and in the
l method ranking under the 22d
, caryophyllei. The calyx is pen-
llous; there is no corolla; the cap-
unilocular, and trivalved, with one
There are three species.

QUICK, or *Quickset hedge*, among gardeners, denotes all live hedges, of whatsoever sort of plants they are composed, to distinguish them from dead hedges; but in a more strict sense of the word, it is restrained to those planted with the hawthorn, or cratægus oxyacantha, under which name these young plants, or sets, are sold by the nursery-gardeners, who raise them for sale.

QUILTING, a method of sewing two pieces of silk, linen, or stuff, on each other, with wool or cotton between them; by working them all over in the form of chequer or diamond work, or in flowers. The same name is also given to the stuff so worked.

QUINCHAMALIA, a genus of the pentandria monogynia class and order. The calyx is inferior, five-toothed; corolla tubular, superior; anth. sessile; seed one. There is one species, a herb of Chili.

QUINCUNX, in Roman antiquity, denotes any thing that consists of five twelfth parts of another, but particularly of the as.

QUINCUNX ORDER, in gardening, a plantation of trees, disposed originally in a square, and consisting of five trees, one at each corner, and a fifth in the middle; or a quincunx is the figure of a plantation of trees, disposed in several rows, both length and breadthwise, in such a manner, that the first tree in the second row commences in the centre of the square formed by the two first trees in the first row, and the two first in the [illegible] resembling the figure of the five at cards.

QUINDECAGON, in geometry, a plane figure with fifteen sides and fifteen angles, which, if the sides are all equal, is termed a regular quindecagon, and irregular when otherwise.

The side of a regular quindecagon, inscribed in a circle, is equal in power to the half-difference between the side of the equilateral triangle, and the side of the pentagon inscribed in the same circle; also the difference of the perpendiculars let fall on both sides, taken together.

QUINTILE, in astronomy, an aspect of the planets when they are 72 degrees distant from one another, or a fifth part of the zodiac.

QUIRE of paper, a quantity of 24 or 25 sheets.

QUISQUALIS, a genus of the monogynia order, in the decandria class of plants, and in the natural method ranking under the 31st order, vepreculæ. The calyx is quinquefid and filiform; the petals five; the fruit is a quinque-angular [illegible]. There is only one species, viz. Indica, a shrub of the East Indies.

QUI TAM, in law, is when an action is brought, or an information exhibited, against a person, on a penal statute, at the suit of the king and the party or informer, when the penalty for breach of the statute is directed to be divided between them; in that case, the informer prosecutes as well for the king as himself.

QUIT-CLAIM, in law, signifies a release of any action that one person has against another. It signifies also a quitting a [illegible], &c.

QUIT-RENT, in law, a small rent [illegible]

Though this writ was forme
only to the king's tenants or
practice now is become ger
plaintiff to surmise, that by th
defendant does him, he is the
satisfy his debt to the king,

R, the seventeenth lette
phabet. In the note
tients, R. or RO. signifies R
Romana civitas; R. G. C. r
causa; R. F. E. D. recte fraci
tum; R. G. F. regis filius
publica, or Romani principes
R. F. F. F. res Romana ruet
flamma.

In the prescriptions of phys

℞ stands for recipe, i. e. take

RAEBETING, in carpentry,
or cutting of channels or
boards. In ship-carpentry,
the letting-in of the planks of t
the keel; which, in the rake a
ship, is hollowed away, that
may join the closer.

RABBIT. See *Lepus*.

RACKOON. See *Ursus*.

RADIAL CURVES, are cu
spiral kind, whose ordinates,
be so called, all terminate in t
the including circle, appearin
of that circle, whence the nam

RADIATION, the act of a bo
or diffusing rays of light all
from a centre.

RADIUS, in geometry, the s
ter of a circle, or a right line d
the centre to the circumference

y ripe, and then drying them in , or by the heat of an oven. The ce between raisins dried in the d those dried in ovens, is very : the former are sweet and plea- at the latter have a latent acidity e sweetness, that renders them ss agreeable.

of a ship, is all that part of her ich hangs over both ends of her That which is before is called the e, or rake-forward, and that part at the setting on of the stern-post the rake-aft or afterward.

US, the *rail*, in ornithology, a ge- onging to the order of grallæ. The hickest at the base, compressed, cute, and somewhat sharp on the ar the point; the nostrils are oval; have four toes, without any web; body is compressed, Mr. Latham, dex Ornithologicus, enumerates es, besides some varieties.

YING, in war, re-assembling or ogether troops broken and put to

battering, in antiquity, a military sed to batter and beat down the places besieged.

DAN, a solemn season of fasting e Mahometans, kept in the ninth f the Arabic year.

ART, in fortification, is an eleva- arth round a place capable of the cannon of an enemy; and into bastions, curtins, &c.

HASTOS, in ornithology, a genus g to the order of picæ. The bill is e, and serrated outwardly. The are situated behind the base of the nd in most of the species the feet l, and placed two forwards and kwards. The tongue is long, and feathered on the edges. Mr. enumerates fifteen different spe-

, *frog*, a genus of amphibia of the ntiles; the generic character is, ur-footed, without tail, and na- without any integument but the

OM SHOT, in gunnery, is a shot hen the muzzle of a gun is raised e horizontal line, and is not de- o shoot directly or point-blank. ost random of any piece is a shot s as far as the bullet will go point-

E, in gunnery, the path of a bal- he line it describes from the the piece to the point where it

ER, a sworn officer of a forest, ap- by the king's letters patent, whose is to walk through his charge, to ck the deer out of the purlieus, to prevent all trespasses with- jurisdiction at the next forest-

ES, in a ship, two pieces of timber across from side to side; the one ecastle, a little abaft the fore- nd the other in the beak-head, e woolding of the bowsprit.

, in war, is a row of soldiers pla- by side.

, the order or place assigned a itable to his quality or merit.

RANUNCULUS, *crowfoot*, a genus of the polygynia order, in the polyandria class of plants; and in the natural method ranking under the 26th order, multisiliquæ. The calyx is pentaphyllous; there are five petals, each with a melliferous pore on the inside of the heel; the seeds na- ked. There are 49 different species of this genus.

RAPE, in law, is where a man has carnal knowledge of a woman by force, and against her will, by 18 Eliz. c. 7, if any person shall unlawfully and carnally know and abuse any woman-child under the age of ten years, whether with her consent or against it, he shall be punish- ed as for a rape. And it is not a suf- ficient excuse in the ravisher, to prove that she is a common strumpet; for she is still under the protection of the law, and may not be forced. Nor is the offence of a rape mitigated by shewing that the woman at last yielded to the violence, if such her consent was forced by fear of death or duress; nor is it any excuse that she con- sented after the fact. 1 Haw. 108.

RAPE is also a name given to a division of a county, and sometimes means the same as a hundred, and at other times signifies a division consisting of several hundreds.

RAPHANUS, *radish*, a genus of the sili- quosa order, in the tetradynamia class of plants; and in the natural method ranking under the 39th order, siliquosæ. The ca- lyx is close: the siliqua torose, or swell- ing out in knots, subarticulated, and round. There are two melliferous glan- dules between the shorter stamina and the pistil, and two between the longer stamina and the calyx. There are six species.

RAPHIDIA, a genus of insects of the or- der neuroptera. The generic character is, mouth with two teeth, head depressed, horny; feelers four, stemmata three; wings deflex; antennæ the length of tho- rax, which is cylindric, and elongated in front; tail of the female furnished with a recurved lax bristle. This genus contains but few species, the most remarkable of which is the raphidia ophiopsis of Lin- næus; a smallish fly, with rather large transparent wings, and a narrow thorax, stretching forwards in a remarkable man- ner.

Raphidia cornuta is a large species, equal in size to one of the larger drag n- flies, and is distinguished by its very long horn-like jaws, which extend far beyond the thorax, and are terminated by a bifid tip: the wings are large, reticulated, and semitransparent.

RAREFACTION, in physics, the act whereby a body is brought to possess more room, or appear under a larger bulk, without the accession of any new matter.

RASANT, or *Razant*, in fortification. Rasant flank, or line, is that part of the curtin or flank whence the shot exploded rase, or glance along, the surface of the opposite bastion.

RASH, in medicine, an eruption upon the skin, thrown out in fevers or sur- feits.

RAT. See *Mus*.

RATAFIA, a spirituous liquor, prepared from the kernels, &c. of several kinds of fruit, particularly of cherries and apricots.

fusing the whole for eight or ten
then straining the liquor, and pu
up for use: or else by infusing thea
cut in pieces in brandy, for a day o
passing it through a straining ba
then putting in the usual ingredien

RATCH, or *Rash*, in clock-work,
of wheel having twelve fangs, which
to lift up the detents every hour
make the clock strike.

RATCHETS, in a watch, are the
teeth at the bottom of the fusee, or
which stops it in winding up.

RATES, in the navy, the orders or
into which the ships of war are d
according to their force and mag
The regulation which limits the r
men of war to the smallest numbe
ble, seems to have been dictated
siderations of political economy, c
simplicity of the service in the roy
yards. The British fleet is acc
distributed into six rates, exclusi
inferior vessels that usually at
naval armaments; as sloops of w
ed ships, bomb-ketches, fire-sh
cutters, or schooners comman
lieutenants. Ships of the first rat
100 cannon, having 42 pounder
lower deck, 24 pounders on the
deck, 12-pounders on the uppe
and 9-pounders on the quarter-
forecastle. They are manned
men, including their officers, sea
rines, and servants.

Ships of the second rate carr
upon three decks, of which thos
lower battery are 32-pounders;
the middle, 18-pounders; on th
deck, 12-pounders; and those
quarter-deck, 6-pounders, whic
amount to four or six. Their con
of men is 750, in which there a
tenants, four master's mates, 24
men, and four surgeon's-mates,
ter-masters and their mates, ei
swain's mates and yeomen, six

ea the quantity of one from the
of another, without the interven-
third.
)N, a certain allowance which is
bread, &c. or forage, when troops
:rvice, for an officer or soldier.
)NALE, a solution or account of
ciples of some opinion, action,
is, phenomenon, or the like.
.INES, or, as the seamen call
atlins, those lines which make
er steps to get up the shrouds and
hence called the ratlins of the

LIN, in fortification, was anti-
lat bastion, placed in the middle
tin; but now a detached work
d only of two faces, which make
angle, without any flanks, and
:fore the curtin on the counter-
'he place. A ravelin is a trian-
ork, resembling the point of a
with the flanks cut off.
N. See *Corvus*.
OLFIA, a genus of the pentan-
ogynia class of plants, the corolla
n consists of a single funnel-
d petal, with a large limb, divided
lanceolated segments; the fruit
culent berry, with two seeds.
e four species.
a beam of light emitted from a
r luminous body.
of the Sun. It has been found by
ent, that there is a very great dif-
n the heating power of the dif-
ys of light.
ars, from the experiments of Dr.
l, that this heating power increas-
he middle of the spectrum to the
and is greatest beyond it, where
are invisible. Hence it is infer-
the rays of light and caloric near-
npany each other, and that the
e in different proportions in the
coloured rays. They are easily
d from each other, as when the
's are transmitted through a trans-
ody, the rays of light pass on
ly undiminished, but the rays of
re intercepted. When the sun's
directed to an opaque body, the
ght are reflected, and the rays of
re absorbed and retained. This
ise with the light of the moon,
owever much it be concentrat-
s no indication of being accom-
with heat. It has also been
that the different rays of light
different chemical effects on the
salts and oxides. These effects
on the opposite direction of the
a, from the heating power of the
om the middle of the spectrum,
the violet end, they become more
, and produce the greatest effect
ie visible rays. From these dis-
it appears that the solar rays are
kinds: 1. Rays which produce
Rays which produce colour; and
hich deprive metallic substances
oxygen. The first set of rays is
st abundance, or are most pow-
ards the red end of the spectrum
east refracted. The second set,
which illuminate objects, are
verful in the middle of the spec-
and, the third set produce the

greatest effect towards the violet end where the rays are most refracted. The solar rays pass through transparent bodies without increasing their temperature. The atmosphere, for instance, receives no increase of temperature by transmitting the sun's rays, till these rays are reflected from other bodies, or are communicated to it by bodies which have absorbed them. This is also proved by the sun's rays being transmitted through convex lenses, producing a high degree of temperature when they are concentrated, but giving no increase of temperature to the glass itself. By this method the heat which proceeds from the sun can be greatly increased. Indeed, the intensity of temperature produced in this way is equal to that of the hottest furnace. This is done, either by reflecting the sun's rays from a concave polished mirror, or by concentrating or collecting them by the refractive power of convex lenses, and directing the rays thus concentrated on the combustible body.

REACTION, in physiology, the resistance made by all bodies to the action or impulse of others, that endeavour to change its state whether of motion or rest.

REALGAR, in chemistry. Arsenic, mineralized by sulphur, forms two ores, named orpiment and realgar, the chemical distinction of which is not very accurately determined. That which has been named realgar is of a red colour, sometimes inclining to scarlet, sometimes to orange. It occurs massive, disseminated, and crystallized, in oblique, tetrahedral or hexaedral prisms, generally small and translucent, or semitransparent, with a shining lustre. Its fracture is uneven: it is soft and brittle, and has a specific gravity of 3.2, or 3.3. It exhales before the blow-pipe a white arsenical smoke, with an arsenical and sulphurous odour, and gives a blue flame. It consists of arsenic and sulphur in the proportions of 80 of the former, and 20 of the latter.

REASONING, the exercise of the faculty of the mind called reasoning; or it is an act or operation of the mind, deducing some unknown proposition from other previous ones that are evident and known.

REACH, in the sea language, signifies the distance between any two points of land, lying nearly in a right line.

REAUMURIA, a genus of the class and order polyandria pentagynia. The calyx is six-leaved; petals five; caps. one-celled, five-valved, many-seeded. There is one species.

REBATE, or *Rebatement*, in commerce, a term much used at Amsterdam, for an abatement in the price of several commodities, when the buyer, instead of taking time, advances ready money.

REBELLION, taking up arms traitorously against the king, be it by natural subjects, or by others once subdued.

REBUTTER, is the answer of the defendant to the plaintiff's surrejoinder.

RECAPITULATION, in oratory, &c. is a summary, or a concise and transient enumeration, of the principal things insisted on in the preceding discourse, whereby the force of the whole is collected into one view.

stamp of greater value than the law requires, incurs no penalty, and the receipt is good; but if on a stamp of a lower value, or on unstamped paper, then a receipt is no discharge, and incurs a penalty.

RECEIVER, in pneumatics, a glass vessel for containing the thing on which any experiment in the air-pump is to be made.

RECEIVER, in chemistry, a vessel of earth, glass, &c. for receiving any distilled liquor.

RECIPE, in medicine, a prescription or remedy, to be taken by a patient: so called because always beginning with the word recipe, i. e. take; which is generally denoted by the abbreviature ℞.

RECIPIANGLE, or *Recipient Angle*, a mathematical instrument, serving to measure re-entering and saliant angles, especially in fortification.

RECIPROCAL *terms*, among logicians, are those which have the same signification; and consequently are convertible or may be used for each other.

RECIPROCAL FIGURES, in geometry, those which have the antecedents and consequents of the same ratio, in both figures.

RECIPROCAL *Proportion*, in arithmetic, is when, in four numbers, the fourth is less than the second, by so much as the third is greater than the first; and vice versa.

This is the foundation of the inverse, or indirect, rule of three: thus, 4 : 10 :: 8 : 5. It is applied also to quantities which being multiplied together, produce unity.

RECITATIVO, or *Recitative*, in music, a kind of singing that differs but little from ordinary pronunciation, such as that in which the several parts of the liturgy are rehearsed in cathedrals; or that in which the actors commonly deliver them-

RECORDA
the sheriff, to
ferior court, in
mon-pleas.

RECORDER
or and other
poration asso
direction in m
ceedings in la
person is gene
person well sk

RECOVERY
thing by judg

A recovery
being an actio
that lands are
of the freehold
pir is vested
ried on throug
ing, instead of
fine.

RECTANG
with a right-a

RECTANG
angled, appell
solids which
gles; thus a
gle, is termed
parallelogram
cubes, &c. a
cones, cylinde
rectangular w
tion, when the
to the plane of

RECTIFIC
finding a righ
curve.

The rectif
of the higher g
the inverse m
conspicuous.

See *Fluxions*,

RECTIFICA
repetition of a
several times
substances pu

rch, and worship God after the
f the church of England, as by
blished; to which is annexed
ty of 20*l*. a month for noncon-
23 Eliz. c. 1.

n dyeing, is one of the five sim-
ther colours.

OK of the exchequer, an an-
ord or manuscript volume, in
ing of the king's remembrancer,
g divers miscellaneous treatises
o the times before the Conquest.

NDUM, in our law, is used sub-
y for the clause in a lease where-
nt is reserved to the lessor.

PTION, in law, a faculty or
e-entering upon lands, &c. that
en sold and assigned, upon re-
g the purchase-money with le-
. Bargains wherein the faculty,
ome call it, the equity, of re-
n is reserved, are only a kind of
ive contracts.

NS, *Redans*, or *Redant*, in fortifi-
 kind of work indented in form
eeth of a saw, with saliant and
ng angles, to the end that one
flank or defend another. It is
aw-work, and indented work.
are frequently used in the forti-
walls, where it is not necessary to
e expence of building bastions;
they stand on the side of a river,
, the sea, &c.

UBT, or *Redoute*, in fortification,
square fort, without any defence
ront, used in trenches, lines of
allation, contravallation, and
, as also for the lodgings of corps
e, and to defend passages. In
grounds, redoubts are frequently
stone works, for the security of
hbourhood; their face consists of
to 15 fathoms, the ditch round
om 8 to 9 feet broad and deep,
r parapets have the same thick-

CT, or *Reduit*, a military term
g an advantageous piece of
entrenched and separated from
of the place, camp, &c. for an
arrison, &c. to retire to in case
prize.

CTION, that rule by which num-
different denominations are
into one denomination.

CTION *of a figure, design, or*
, is the making a copy of it either
r smaller than the original, still
ing the form and proportion. The
se of the proportional compasses
reduction of figures, &c. whence
e called compasses of reduction.
are various methods of reducing
, &c. The most easy is by means
entagraph, or parallelogram; but
s its defects.

). See *Arundo*.

, a term in navigation. When
a great gale of wind, they com-
roll up part of the sail below, that
means it may become the narrow-
not draw so much wind; which
cting or taking up the sail they call
or reefing the sail; so also when
mast is sprung, as they call it, that
cast is cracked, or almost broken

in the cap, they cut off the lower piece that was nearly broken off, and setting the other part, now much shorter, in the step again, they call it a reefed top-mast.

REEL, in the manufactories, a machine serving for the office of reeling. There are various kinds of reels, some very simple, others very complex. Of the common kinds those most in use are, 1. A little reel held in the hand, consisting of three pieces of wood, the biggest and longest whereof (which does not exceed a foot and a half in length, and one-fourth of an inch in diameter) is traversed by two other pieces disposed different ways. 2. The common reel, or windlass, which turns upon a pivot, and has four sights traversed by long pins or sticks, whereon the skein to be reeled is put, and which are drawn closer or opened wider, according to the skein.

REELING, in the manufactories, the winding of thread, silk, cotton, or the like, into a skein.

RE-ENTRY, in law, signifies the resuming or retaking a possession in lands lately lost.

REEVING, in the sea language, the putting a rope through a block; hence to pull a rope out of a block, is called unreeving.

REFINING, in general, is the art of purifying a thing; including not only the assaying or refining of metals, but likewise the separation or clarification of liquors. Gold and silver may be refined by several methods, which are all founded on the essential properties of these metals, and acquire different names according to their kinds.

As none but the perfect metals can resist the combined action of air and fire, without losing their inflammable principle and being changed into earthy or vitreous matters, incapable of remaining any longer united with substances in a metallic state, there is then a possibility of purifying gold and silver from an allay of imperfect metals merely by the action of fire and air, only by keeping them fused till all the allay is destroyed; but this purification would be very expensive, from the great consumption of fuel, and would be exceedingly tedious. Silver allayed with copper has been exposed longer than 60 hours to a glass-house fire without being perfectly refined; the reason of which is, that when a small quantity only of imperfect metal remains united with gold or silver, it is covered and protected from the action of the air, which is necessary for the combustion of the imperfect metals, as of all combustible matters.

This refining of gold and silver merely by the action of fire, which was the only method anciently known, was very long, difficult, expensive and imperfect; but a much shorter and more advantageous method has been discovered. This method consists in adding to the allayed gold, and silver a certain quantity of lead, and exposing afterwards this mixture to the action of the fire. Lead is one of the metals which loses most quickly and easily a sufficient quantity of its inflammable principle to cease to be in a metallic state; but, at the same time, this

of its inflammable principle. 3
vitrifying and fusing property v
exercises with all its force upon
cined and naturally refractory par
other metals, it facilitates and acc
the fusion, the scorification, and
paration, of these metals. These
advantages procured by lead in
fining of gold and silver.

The lead, which in this oper
scorified, and scorifies along wi
imperfect metals, separates from
tallic mass, with which it is then
ble of remaining united. It floa
the surface of the melted mass,
by losing part of its phlogiston,
also part of its specific gravity, a
it vitrifies.

These vitrified and melted ma
cumulating more and more upon
face of the metal while the oper
vances, would protect this surf
the contact of air which is so a
necessary for the scorification of
and would thus stop the progre
operation, which could never be
if a method had not been cont
their removal. This removal
trified matter is procured eithe
nature of the vessel in which th
matter is contained, and which
rous, absorbs and imbibes the
matter as fast as it is formed
channel cut in the edge of th
through which the matter flows

The vessel in which the refini
formed is flat and shallow, that
ter which it contains may prese
air the greatest surface possibl
form resembles that of a cup, a
it has been called cupel. Th
ought to be vaulted, that the he
applied upon the surface of
during the whole time of the
Upon this surface a crust of dark
pellicle is continually forming,

ıas a chaplain and surgeon. See
ınd *Company*. Some German re-
s consist of 2000 foot, and the regi-
of Picardy, in the old French ser-
onsisted of 120 companies, or 6000

ISTER, a public book, in which is
d and recorded memoirs, acts, and
:s to be had recourse to occasion-
or knowing and proving matters of
Of these there are several kinds;
legisters of deeds in Yorkshire and
sex, in which are registered all
conveyances, wills, &c. that affect
nds or tenements in those coun-
hich are otherwise void against any
uent purchasers, or mortgagees,
ıt this does not extend to any co-
l estate, nor to leases at a rack-
or where they do not exceed 21
The registered memorials must
grossed on parchment, under the
ınd seal of some of the grantors or
es, attested by witnesses who are
re the signing or sealing of them,
he execution of the deed. But
registers, which are confined to
unties, are in Scotland general, by
the laws of North Britain are ren-
very easy and regular. Of these
are two kinds; the one general,
at Edinburgh, under the direction
Lord Register: and the other is
ın the several shires, stewartries,
egalities, the clerks of which are
d to transmit the registers of their
:tive courts to the general register.
an in Scotland can have a right to
tate, but it must become registered
ı 40 days of his becoming seised
f; by which means all secret con-
ces are cut off. 2. Parish registers
oks in which are registered the
ms, marriages, and burials of each

ong dissenters who admit of infant
m, each minister is supposed to
a register of the several children
ed by him. But as these are fre-
ly lost, by the succession of new
ers to the same congregation; or
ı do not give an account of the date
births, which may have happened
weeks or months before baptism,
now almost generally the custom
; dissenters of all denominations to
:r the births of their children at the
y in Red-cross Street, Cripplegate,
ıch the charge is six pence. This
:r is admitted in the courts of law.
ISTER is also used for the clerk or
r of a register. Of these we have
ı, denominated from the registers
eep; as register of the high court of
tes; register of the arches court of
bury; register of the court of ad-
y: register of the prerogative court,
:r of the garter, &c.
ISTER, in printing, is disposing
ms on the press, so that the lines
ages printed on one side of the
fall exactly on those of the other.
ISTER, among letter-founders, is
the inner parts of the mould in
the printing-types are cast. Its
to direct the [illegible] the mould
justly together again, after opening it to take out the new-cast letter.

REGLETS, or *Riglets*, in printing, are thin slips of wood, exactly planed to the size of the body of the letter. The smaller sorts are placed between the lines of poetry; and both those and the larger are used in filling up short pages, in forming the whites or distances between the lines of titles, and in adjusting the distances of the pages in the chase so as to form register.

REGRATOR, or *Regrater*, in law, formerly signified one who bought wholesale, or by the great, and sold again by retail; but the term is now used for one who buys any wares or victuals, and sells them again in the same market or fair, or within five miles round it.

REGRATOR, is also used for one who furbishes up old moveables to make them pass for new. And masons who take off the outward surface of hewn stone, in order to whiten it, or make it look fresh again, are said to regrate.

REGULAR, denotes any thing that is agreeable to the rules of art: thus we say a regular building, verb, &c. A regular figure in geometry is one whose sides, and consequently angles, are equal; and a regular figure with three or four sides is commonly termed an equilateral triangle or square, as all others with more sides are called regular polygons. All regular figures may be inscribed in a circle. A regular solid, called also a platonic body, is that terminated on all sides by regular and equal planes, and whose solid angles are all equal.

REGULATOR *of a watch*, the small spring belonging to the balance; serving to adjust its motions, and make it go faster or slower.

REGULUS, in chemistry, an imperfect metallic substance that falls to the bottom of the crucible in the melting of ores, or impure metallic substances.

REGULUS, in astronomy, a star of the first magnitude, in the constellation Leo; called also from its situation, cor leonis, or the lion's heart.

REIN-DEER. See *Cervus*.

REJOINDER, in law, is the defendant's answer to the plaintiff's replication or reply.

RELEASE, in law, is an instrument in writing, by which estates, rights, titles, entries, actions, and other things, are extinguished and discharged; and sometimes transferred, abridged, or enlarged; and in general, it signifies one person's giving up or discharging the right or action he has, or claims to have, against another, or his lands, &c. A release may be either in fact or in law, a release in fact is where it is expressly declared, by the very words, as the act and deed of the party; and a release in law is that which acquits by way of consequence, as where a female creditor takes the debtor to be her husband.

RELHANIA, a genus of the class and order syngenesia polygamia superflua. The calyx is imbricate, scariose; corollets of the ray many; pappus membranaceous, recept. chaffy. There are [illegible] species

are so prominent from the grou
merely a small part of them
attached to it. Mezzo-relievo,
relief, when one half of the fig
from the ground, in such a ma
the figure appears divided by it.
relievo, or bas-relief (low relie
the work is raised but little
ground, as in medals, and gen
friezes and other ornamented
buildings. Bas-relief is the com
sive term by which all works in
are denominated indiscriminate
Sculpture.

RELIEVO, or *Relief*, in paintin
degree of boldness with whic
gures seem, at a due distance,
out from the ground of the
See *Painting*.

RELIGION. Seditious words i
tion of the established religion
dictable, as tending to a brea
peace. 1 Haw. 7.

REMAINDER, in law, is an es
ed in lands, tenements, or re
enjoyed after the expiration o
particular estate.

REMEMBRANCERS, antientl
clerks of the remembrance, certa
in the exchequer, whereof thre
tinguished by the names of the
membrancer, the lord treas
membrancer, and the remem
the first fruits.

REMIT, in commerce. To re
of money, bill, or the like, is t
sum of money, &c.

REMITTER, in law, is where
has a right to lands, but is ou
session, has afterwards the free
upon him by some subsequent
title, and enters by virtue o
tle.

REMOVER, in law, is where a
moved or taken out of one cour
ther; and is the opposite of

ion of objects and figures, by en-
g and fixing the eye so that it cannot
l to the other parts of the painting
me time; and thus leading it to con-
the several groups gradually pro-
ng from stage to stage.

'RESENTATION. There is an heir
presentation, where the father dies,
life of the grandfather, leaving a
who shall inherit the grandfather's
, before the father's brother, &c.

'RIEVE, to suspend a prisoner from
ecution and proceeding of the law
t time.

'RISE, or REPRIZE, at sea, is a mer-
ship, which, after its being taken by
air, privateer, or other enemy, is re-
by the opposite party.

'TILES, in natural history, an order
phibia, the character of which is,
hey breathe through the mouth;
feet, and flat naked ears, without
es.

'ULSION, in physics, that property
lies, by which, if they are placed
eyond the sphere of each other's
tion of cohesion, they mutually fly
each other.

UESTS, *Court of*, an antient court
ity, instituted about the nineteenth
f Henry VII.

CRIPT, an answer delivered by an
ror, or pope, when consulted by
ular persons, on some difficult ques-
r point of law, to serve as a deci-
hereof.

CUE, or RESCOUS, is, the forcibly
g another from an arrest or some
commitment; which being a high
e, subjects the offender not only to
on at the suit of the party injured,
ewise to fine and imprisonment at
it of the king.

EARCH, in music, is a kind of pre-
r voluntary played on the organ,
erein the performer seems to search
k out for the strains and touches of
ny, which he is to use in the regular
to be played afterwards.

EDA, *dyer's-weed*, *yellow weed*, *weld*,
wood, a genus of the order of tri-
in the dodecandria class of plants;
the natural method ranking under
h order, miscellaneæ. The calyx
ophyllous and partite; the petals
ted; the capsule unilocular, and
g at the mouth. There are 13 species.

ERVE, *body of*, or *corps de reserve*, in
y affairs, the third or last line of
y drawn up for battle.

DENCE, is the continuance of a
or vicar on his benefice.

DUAL FIGURE, in geometry, the
remaining after subtracting a lesser
greater.

DUAL ROOT, in algebra, a root
sed of two parts or members, con-
together by the sign —.

GNATION, in the canon law, the
dering a benefice into the hands of
lator, or bishop.

GNEE, in law, the person to whom
is resigned.

N, in natural history, a viscid juice
either spontaneously, or by inci-
m several trees as the pine, fir, &c.

RESISTANCE, or *resisting force*, in philosophy, denotes, in general, any power which acts in an opposite direction to another, so as to destroy or diminish its effect.

RESISTANCE *of solids*, in mechanics, is the force with which the quiescent parts of solid bodies oppose the motion of others contiguous to them.

RESISTANCE of the fibres of solid bodies, is more properly called cohesion.

RESOLUTION, in chemistry, &c. the reduction of a mixed body into its component parts, or first principles, by a proper analysis.

RESOLUTION, in music, is when a canon or perpetual fugue is not written on a line, or in one part, but all the voices that are to follow the guide or first voice are written separately either in score, that is in separate lines, or in separate parts, with the pauses each is to observe, and in the proper tone to each.

RESPIRATION consists in drawing a certain quantity of air into the lungs, and throwing it out again alternately. Whenever this function is suspended, even for a very short time, the animal dies.

REST, in music, the same with pause.

RESTAURATION, in architecture, the act of repairing those parts of a building that are gone to decay, in such a manner as to give it its original strength and beauty.

RESTIO, a genus of the triandria order, in the diœcia class of plants. The male calyx is an ovate spike of membranaceous scales; the corolla is proper, hexapetalous, and persistent. The female calyx and corolla are as in the male; the germen is roundish, and is sex-sulcated; there are three erect and persistent styles; the capsule is roundish, with six plaits, and is rostrated and trilocular; the seeds are oblong and cylindrical. There are twenty-eight species.

RETAINER, in law, a servant who does not continually dwell in the house of his master, but only attends upon special occasions.

RETAINING FEE, the first fee given to a serjeant or counsellor at law, in order to make him sure, and prevent his pleading on the contrary side.

RETARDATION, in physics, the act of diminishing the velocity of a moving body.

RETE MIRABILE, in anatomy, a small plexus, or net-work, of vessels in the brain, surrounding the pituitary gland.

RETENTION, is defined, by Mr. Locke, to be a faculty of the mind, whereby it keeps or retains those simple ideas it has once received by sensation or reflection.

RETENTION, is also used in medicine, &c. for the state of contraction in the solids or vascular parts of the body, which makes them hold fast their proper contents.

RETICULA, or RETICULE, in astronomy, a contrivance for the exact measuring the quantity of eclipses.

RETINA, in anatomy, the expansion of the optic nerve on the internal surface of the eye, whereupon the images of objects

ion in the 29th natural ord
ceæ. The capsule is biloc
rolla cylindrical, and vill
the stigma bifid. There is
the Cape, frutescent.

REVE, REEVE, or **GRE**
of a franchise, or manor,
especially in the west of En

REVEILLE, a beat of dru
of day, to give notice that
the soldiers to arise, and th
are to forbear challenging.

REVELS, entertainments
masking, acting comedies, fr

REVENUE, *public*, the
appropriated to the expen
ment. There are four diffe
public revenue: 1. The in
from property vested in the
2. The emoluments of lucr
tives annexed to the soverei
luntary contributions from
4. Taxes or imposts, not s
given, but legally exacted.
other of these great sources
venue must arise.

REVERBERATION, in
act of a body repelling or re
ther after its impinging on it.

REVERSE *of a medal, coin,*
the second or back side, in o
the head or principal figure.

REVERSED, in heraldry,
ed backwards or upside-dow

REVERSION, in law, is d
returning of lands, &c. into th
of the donor, or his heirs.

REVERSION *of series*, in al
of reversed operation of an in

REVIEW, in chancery, is
bill where a cause has been h
decree thereon signed; but
in law appearing upon the de
matter being discovered after i
this bill is given for a fresh e
into the merits of the cause.

REVIEW, in

point of view, rhetoric will comprehend all polite literature, poetry perhaps excepted, the belles-lettres of the French, the pathetic and pleasant of every kind; compositions whose aim and end is not so much to inform or satisfy the understanding, as to move, incline, and persuade, by addressing the imagination, the affections, and in some measure sensation itself. There cannot be a better rule for composition, or one more plain and practical, than what is laid down by Cicero: "We are first to consider what is to be said; secondly, how; thirdly in what words; and lastly, how it is to be ornamented."

RHEUM, a thin serous humour, occasionally oozing out of the glands about the mouth and throat.

RHEUM, *rhubarb*, a genus of the monogynia order, in the enneandria class of plants, and in the natural method ranking under the 12th order, holoraceæ. There is no calyx; the corolla is sexfid and persistent; and there is one triquetrous seed. There are seven species.

RHEUMATISM, a well known painful distemper, coming, as is supposed, from acid humours.

RHEXIA, a genus of the monogynia order, in the octandria class of plants, and in the natural method ranking with those of the 17th order calycanthemæ.

RHINANTHUS, a genus of the angiospermia order, in the didynamia class of plants, and in the natural method ranking under the 40th order, personatæ.

RHINOCEROS, a genus of quadrupeds of the order belluæ: the generic character is, horn solid, perennial, conical, seated on the nose.

RHINOMACER, a genus of insects of the order coleoptera. The generic character is, antennæ setaceous, seated on the snout; feelers four, growing thicker towards the end, the last joint truncate.

RHIZOBALUS, a genus of the tetragynia order, in the polyandria class of plants, and in the natural method ranking under the 23d order, trihilatæ.

RHIZOPHORA, the *mangrove* or *mangle*, a genus of the monogynia order, in the dodecandria class of plants, and in the natural method ranking under the 12th order, holoraceæ.

RHODIOLA, *rose-wort*, a genus of the octandria order, in the diœcia class of plants, and in the natural method ranking under the 13th order, succulentæ.

RHODODENDRUM, *dwarf rose-bay*, a genus of the monogynia order, in the decandria class of plants, and in the natural method ranking under the 18th order, bicornes.

RHODORA, a genus of the decandria monogynia class and order.

RHOPALA, or *Rupala*, a genus of the monogynia order, in the tetrandria class of plants, and in the natural method ranking with those that are doubtful.

RHORIA, a genus of the class and order triandria monogynia; the cal. is bell-shaped, five-petaled, unequal; stigmas three, revolute; caps. There is one species, a shrub of Guiana.

RHUBARB. See *Rheum*.

RHUMB, in navigation, a vertical circle of any given place, or the intersection of such a circle with the horizon, in which last sense rhumb is the same with a point of the compass.

RHUMB-LINE, is also used for the line which a ship describes when sailing in the same collateral point of the compass, or oblique to the meridians.

RHUS, *sumach*, a genus of the trigynia order, in the pentandria class of plants, and in the natural method ranking under the 43d order, dumosæ.

RHYME. See *Poetry*.

RHYTHMICAL, in music, an epithet applied to the property or quality, in the antient melopœia and modern melody, by which the cadences, accents, and quantities, are regulated and determined.

RIAL, or *Royal*, is the name of a piece of gold, antiently current among us for ten shillings.

RIBBAND, or *Ribbon*, a narrow sort of silk, chiefly used for head-ornaments, badges of chivalry, &c.

RIBES, the *currant* and *gooseberry-bush*, a genus of the monogynia order, in the pentandria class of plants, and in the natural method ranking under the 36th order, pomaceæ.

RICCIA, a genus of the natural order of algæ, belonging to the cryptogamia class of plants.

RICHARDIA, a genus of the monogynia order, in the hexandria class of plants, and in the natural method ranking under the 47th order, stellatæ.

RICHERIA, a genus of the class and order diœcia pentandria.

RICINUS, or *Palma Christi*, a genus of the monadelphia order, in the monœcia class of plants, and in the natural method ranking under the 38th order, tricoccæ. The male calyx is quinquepartite; there is no corolla; the stamina numerous. The female calyx is tripartite; there is no corolla, but three bifid styles, with a trilocular capsule, and a single seed. There are six species.

RICOTIA, a genus of the siliquosa order, in the tetradynamia class of plants, and in the natural method ranking under the 39th order, siliquosæ. The siliqua is unilocular, oblong, and compressed, with plain valvules. There is one species.

RIDEAU, in fortification, is a small elevation of earth, extending lengthwise on a plain, and serving to cover a camp, or to give an advantage to a post.

RIDERS, in a ship, are large timbers, both in the hold and aloft, bolted on to other timbers to strengthen them, when the ship is discovered to be too slightly built.

RIDING-CLERK, one of the six clerks in chancery, who, in his turn, annually keeps the controlment-books of all grants that pass the great seal that year.

RIFLE, a fire-arm which has the inside of its barrel cut with from three to nine or ten spiral grooves, so as to make it resemble a female screw, varying from a common screw only in this, that its grooves or rifles are less deflected, and approach more to a right line; it being now usual for the grooves with which the best rifled barrels are cut, to take about one whole turn in a length of thirty inches. The

ring, and serving to take altitudes of
sun.

RIOT, in law. When three person
more shall assemble themselves toget
with an intent mutually to assist one a
ther, against any who shall oppose th
in the execution of some enterprize
a private nature, with force or viole
against the peace, or to the manifest
ror of the people, whether the act inte
ed was of itself lawful or unlawful; if t
only meet for such a purpose or int
though they shall after depart of t
own accord without doing any thing,
is an unlawful assembly. 1 Haw. 155.

RITTERY, a genus of the class and
der polyandria monogynia. The caly
four-leaved; petal one; legume one-c
ed, two-valved. Thre are five specie

RITUAL, a book directing the order
manner to be observed in celebrating
ligious ceremonies, and performing
vine service, in a particular church,
cese, order, or the like.

RIVER, a current, or stream of fresh
ter, flowing in a bed or channel, from
source into the sea.

RIVINA, a genus of the tetrandria
nogynia class and order. The periant
is four-leaved, coloured, and perman
the leaflet oblong, egged and obtuse; th
is no corolla, unless the calyx is consi
ed as such. There are four or eight
ments, shorter than the calyx, approa
ing by pairs, permanent; the antheræ
small. The germ is large and roundi
the style very short; the stigma sim
and obtuse. The berry is globular, sit
on the green reflected calyx, one-cel
with an incurved point. There is
seed, lenseform, and rugged. There
four species.

RIX-DOLLAR, a silver coin curren
different parts of Europe.

ROAD, in navigation, is a place of
chorage at some distance from sh

nd when very thick, a cable.
erent kinds of this manufac-
a fishing-line or whip cord
of a first-rate ship of war.
neral name of cordage.
rose, a genus of the polygy-
the icosandria class of plants
natural method ranking un-
order, senticosæ. There are
the calyx is urceolated, quin-
ous, and straitened at the
seeds are numerous, hispid,
to the inside of the calyx
species.
A, a genus of the class and
ndria monogynia. The calyx
d; corolla five-petalled; an-
orm; capsule three-valved.
species.
INUS, *rosemary*, a genus of
nia order, in the diandria class
and in the natural method
er the 42d order, verticillatæ
is unequal, with its upper
; the filaments are long, curv-
nple, each having a small
e are two species.
, a genus of the monogynia
e triandria class of plants.
s tridentate: there is no co-
apsule is trilocular and poly-
There is one species, an an-
ast Indies.
ON, in geometry, a term
ied to the circumvolution of
round a fixed and immoveable
is called the axis of its rota-
y such rotations it is, that so-
ceived to be generated.
a genus of the class and or-
sia polygamia æqualis. The
ny-leaved in a single row;
ot, in the ray chaffy in the disk
; in the ray bald, in the disk
There is one species.
O, or *Rotundo*, in architec-
pellation given to any build-
ound both within and with-
r it is a church, a saloon, or

LLIA, a genus of the digynia
triandria class of plants. The
ited, roundish, and in many
: the calyx is ovate, lanceo-
simple, or bipartite; the flo-
rnate on the winding rachis.
species.
in a military sense, signifies a
some officer, attended with a
ers, takes in a fortified place
ramparts, in the night time,
e that the sentries are watch-
ry thing in good order.
, a genus of the tetrandria
class and order. The calyx
d, corolla one-petalled, bell-
cleft, inferior; berry qua-
many-seeded. There is one

GHIA, a genus of the octan-
nia class and order. The ca-
eaved, corolla four-petalled;
our, awl-shaped; anthers l-
ale one-celled, two-valved;
There is one species
, a genus of the digynia or-
decandria class of plants; and

in the natural method ranking under the 18th order, bicornes. The calyx is urceolated; the corolla monopetalous with the limb revolute; the capsule is unilocular and quadri-valved. There are seven species.

RUBIA, *madder*, a genus of the monogynia order, in the tetrandria class of plants, and in the natural method ranking under the 47th order, stellatæ. The corolla is monopetalous and campanulated; and there are two monospermous berries. There are seven species.

RUBRIC, in the canon law, signifies a title or article in certain antient law-books; thus called because written, as the titles of the chapters in our antient bibles are, in red letters.

RUBUS, the *raspberry*, a genus of the polygamia order, in the icosandria class of plants; and in the natural order ranking under the 35th order, senticosæ. The calyx is quinquefid, the petals five; the berry consisting of monospermous acini or pulpy grains. There are 32 species.

RUBY, a genus of precious stones of various colours; as, 1. Of a deep red colour, inclining a little to purple: the carbuncle of Pliny. 2. The spinell, of the colour of a bright corn poppy flower. 3. The balass, or pale red, inclining to violet. The rubicell, of a reddish yellow.

RUDBECKIA, *dwarf sun flower*, in botany, a genus of the syngenesia polygamia frustranea class of plants, the compound flower of which is radiated; but the hermaphrodite corrollulæ of the disc are tubulose and very numerous: the stamina are five very short capillary filaments; and there is a small orbiculated seed after each of the hermaphrodite corollulæ, and are all contained in the cup, affixed to a paleaceous receptacle. There are seven species.

RUDDER, in navigation, a piece of timber turning on hinges in the stern of the ship, and which, opposing sometimes one side to the water, and sometimes another, turns or directs the vessel this way or that.

RUELLIA, in botany, a genus of the angiospermia order, in the didynamia class of plants; and in the natural method ranking under the 40th order, personatæ. The calyx is quinquepartite; the corolla sub-campanulated; the stamina approaching together in pairs, the capsule springing asunder by means of its elastic segments. There are 45 species.

RUIZIA, a genus of the polyandria order, in the monadelphia class of plants; and in the natural method ranking under the 37th order, columniferæ. The calyx is double; the external are triphyllous. The corolla consists of five petals, inclining to the right hand side, and adhering to the stamina, which are from 30 to 40. It has ten styli, and as many capsulæ. These are compressed and membranous. In each capsule are two seeds. There are three species.

RULES *of court*, in law, are certain orders made, from time to time, in the courts of law, which attornies are bound to observe, in order to avoid confusion, and both the plaintiff and defendant are at their peril also bound to pay obedience to rules made in court relating to the cause depending between them.

RULE, or *Ruler*, an instrument of wood or metal, with several lines delineated on it, of great use in practical mensuration.

RUM, a species of vinous spirit, distilled from sugar-canes.

RUMEN, in comparative anatomy, the paunch, or first stomach of such animals as chew the cud, thence called ruminant animals.

RUMEX, *dock*, a genus of the trigynia order in the hexandria class of plants; and in the natural method ranking under the 12th order, holoraceæ. The calyx is triphyllous; there are three connivent petals, and one triquetrous seed. There are 36 species.

RUMINANT, in natural history, is applied to an animal which chews over again what it has eaten before; which is popularly called chewing the cud.

RUMPHIA, a genus of the monogynia order, in the triandria class of plants, and in the natural method ranking with those of which the order is doubtful. The calyx is trifid; the petals three; the fruit a trilocular plum. There is one species.

RUNDLET, or *Runlet*, a small vessel, containing an uncertain quantity of any liquor, from three to twenty gallons.

RUNNER, in the sea language, a rope belonging to the garnet, and to the two bolt-tackles.

RUNNET, or *Rennet*, is the acid juice found in the stomachs of sucking quadrupeds, which as yet have received no other nourishment than their mother's milk.

RUPALA, a genus of the tetrandria monogynia class and order.

RUPERT'S DROPS, a sort of glass drops with long and slender tails, which burst to pieces on the breaking off those tails in any part; said to have been invented by prince Rupert, and therefore called by his name.

RUPPIA, a genus of the tetragynia order, in the tetrandria class of plants and in the natural method ranking under the 15th order, inundatæ. There is neither calyx nor corolla; but four pedicellated seeds. There is one species.

RUSCUS, *knee-holly*, or *bu*
genus of the syngenesia or
œcia class of plants; and
ral method ranking under
sarmentaceæ. The male
phyllous; there is no cor
tarium is central, ovate,
at the top. The female
and nectarium, are the sa
male, there is one style,
lar two-seeded berry. T
species.

RUSSELIA, a genus of t
angiospermia class and orde
is five leaved; corolla tub
capsule acuminate. Ther
cies.

RUST, the oxide of a me

RUSTIC, in architectu
manner of building in imit
rather than according to th

RUTA, *rue*, a genus of
order, in the decandria cl
and in the natural method
the 26th order, multisiliqu
is quinquepartite; the pe
the receptacle surrounded
ferous pores; the capsule
some flowers, a fifth part
is excluded. There are

RUTHILE, an ore foun
Italy, and France. It is
tallized.

RYSCHIA, in botany, a
monogynia order, in the p
of plants; and in the n
ranking with those that are
calyx is pentaphyllous; the
tripetalous; and the berry
There are two species

RYANIA, a genus of
monogynia class and ord
is five-leaved; corolla non
berry suberous, one-celled
There is one species.

RYNCHOPS, *skimmer*,
a genus belonging to the or
The bill is straight, and
mandible much shorter tha
which is truncated at the
are two species.

S

S, The eighteenth letter of our alphabet, in abbreviations stands for societas or socius; as R. S. S. for regiæ societatis, socius, i. e. fellow of the royal society. In medicinal prescriptions, S. A. signifies secundum artem, i. e. according to the rules of art; and in the notes of the antients, S. stands for Sextus; SP. for spurious; S. C. for senatus consultum; S. P. Q. R. for senatus populusque Romanus; S. S. S. for stratum super stratum, i. e. one layer above another alternately; S. V. B. E. E. Q. V. for si vales bene est, ego quoque valeo, a form used in Cicero's time, in the beginning of letters. Used as a numeral, S antiently denoted seven; in the Italian music, S. signifies solo; and in books of navigation, S. stands for south; S. E. for south-
south-west; S. S. E. for so
S. S. W. for south-south-we

SABBATARIANS, a sec
who observe the Jewish o
bath.

SABELLA, a genus of ve
animal a nereis, with a
and two thicker tentacu
head; shell tubular, com
cles of sand, broken shells,
substances united to a m
glutinous cement. There

SABELLIANS, a sect o
the third century, who em
nions of Sabellius, a philos
who openly taught that th
person in the Godhead.

BUT, a bass wind-instrument, re-
ng the trumpet, so contrived as to
able of being drawn out to different
, according to the acuteness and
of the scale required.

CHARINE ACID. See *Oxalic Acid.*

CHARUM, *sugar*, or the *sugar-cane*,
s of the digynia order, in the tri-
class of plants; and in the natu-
thod ranking under the fourth order.
a. The calyx is two-valved; the
is also bivalved. There are eleven
.

COLATS, salts formed from the
ic acid, and but little known.

K *of wool*, a quantity of wool con-
just twenty-two stone, and every
fourteen pounds. In Scotland, a
s twenty-four stone, each stone con-
g sixteen pounds.

K *of cotton-wool*, a quantity from
ndred and a half to four hundred
.

KS *of earth*, in fortification, are can-
ags filled with earth. They are
n making intrenchments in haste,
ce on parapets, or the head of the
hes, &c. or to repair them, when
n down.

LACTIC ACID, an acid obtained
gum arabic, and other mucilaginous
nces.

FRON. See *Crocus.*

ATHEE, a slight kind of woollen
serge, or ratteen, sometimes mixed
little silk.

E. See *Salvia.*

ENE, a Russian long measure, five
ed of which make a werst, equal
en English feet.

INA, *pearlwort*, a genus of the te-
nia order, in the tetrandria class of
, and in the natural method rank-
nder the 22d order, caryophyllei.
e are five species.

GITTA, in astronomy, the arrow or
a constellation of the northern hemi-
re, near the eagle.

GITTA, in trigonometry, the same
the versed sine of an arch.

GITTARIA, *arrow-head*, a genus of
polyandria order, in the monoecia
of plants, and in the natural method
ing under the fifth order, tripeta-
æ. There are five species.

GITTARIUS, the *archer*, in astrono-
the ninth sign of the zodiac.

GO, a simple brought from the East
s, of considerable use in diet as a re-
tive. It is produced from the pith of
nd of palm which grows in the East
es, called the cycas circinalis.

LIANT, in fortification, denotes pro-
ng.

IIC, or *Salique Law*, *lex Salica*, an
ent and fundamental law of the king-
of France, usually supposed to have
made by Pharamond, or at least by
is, in virtue of which males are only
herit.

ALIBURIA, a genus of the class and
r monoecia polyandria. There is one
ies.

ALICORNIA, *jointed glasswort*, or
wort, a genus of the monogynia order,
he monandria class of plants, and in
natural method ranking under the 12th
r, holoraceæ. There are nine species.

SALIVA. The fluid secreted in the mouth, which flows in considerable quantity during a repast, is known by the name of saliva.

SALIX, the *willow*, a genus of the diandria order, in the dioecia class of plants, and in the natural method ranking under the 50th order, amentaceæ. There are 33 species.

SALMASIA, a genus of the pentandria trigynia class and order. There is one species.

SALMO, *salmon*, a genus of fishes of the order abdominales. The generic character is, head smooth, compressed, [illegible] cartilaginous; teeth both in the jaws and on the tongue, gill-membrane from four to ten rays; body compressed, furnished at the hind part with an adipose fin.

SALON, or *Saloon*, in architecture, a very lofty spacious hall, vaulted at top, and sometimes comprehending two stories or ranges of windows.

SALPA, a genus of insects of the order mollusca. Body loose, natant, gelatinous, tubular, and open at each extremity; intestines obliquely placed.

SALSOLA, *saltwort, kali*, &c. a genus of the class and order pentandria digynia, and in the natural method ranking under the 12th order, holoraceæ. The species are thirty-one.

SALT, *common*. The preparation of that kind of salt which is used for culinary and economical purposes (muriat of soda) depends upon the well-known fact, that the salt contained in the sea-water or brine-springs, being a fixed body, will not rise with the vapour of the water. All therefore, that is wanted, is to expose any water containing salt to evaporation.

Sixteen tons of the strongest brine consist of 12 tons of water, and four tons of salt, and, in order to obtain these four tons of salt, the 12 tons of water must be, by some means or other, evaporated, so as to leave the salt in a concrete form.

SALTS, in chemistry, are all the crystallizable acids, or alkalies, or earths, or combination of acids with alkalies, earths, or metallic oxides.

SALVADORA, a genus of the monogynia order, in the tetrandria class of plants and in the natural method ranking with those of which the order is doubtful. There are three species.

SALVAGE MONEY, a reward allowed by the civil and statute law for the saving of ships or goods from the danger of the seas, pirates, or enemies.

SALVIA, *sage*, a genus of the monogynia order, in the diandria class of plants, and in the natural method ranking under the 42d order, verticillatæ. There are 79 species.

SAMARA, a genus of the monogynia order, in the tetrandria class of plants. There are three species.

SAMARITANS, an ancient sect among the Jews, still subsisting in some parts of the Levant, under the same name.

SAMBUCUS, *elder*, a genus of the trigynia order, in the pentandria class of plants, and in the natural method ranking under the 43d order, dumosæ. The species are only five.

SAMIELS, the Arabian name of a hot wind, peculiar to the desert of Arabia.

of great use in the glass
ture; the white writing-sand
ployed for making of the wh
and a coarse greenish-looking
the green glass. In agriculture
to be the office of sand to make
earths fertile, and fit to suppo
bles, &c. See *Husbandry*.

SAND-BAGS, in the art of
bags filled with earth or sand, hol
about a cubic foot. Their use is
parapets in haste, or to repair
beaten down.

SANDARACH, in natural histo
ry beautiful native fossil.

SANDIVER, a whitish salt, co
cast up from the metal, as it
whereof glass is made, and swim
its surface, is skimmed off.

SANDORICUM, a genus of th
gynia order, in the decandria
plants, and in the natural method
under the 23d order, trihilatæ.

SANGUINARIA, *blood-wort*, a
the monogynia order, in the po
class of plants, and in the natu
thod ranking under the 27th order
deæ. There is only one species.

SANGUISORBA, *greater wild b*
genus of the monogynia order, in
trandria class of plants, and in th
ral method ranking under the 54t
miscellaneæ. There are three spe

SANHEDRIM, or rather *Sa*
among the Jews, the great counc
nation consisting of seventy senat

SANICULA, *sanicle*, or *self-heal*
nus of the digynia order, in the
dria class of plants, and in the
method ranking under the 45th
umbellatæ.

SANIDIUM, in natural histor
name of a genus of fossils of the
the selenitæ.

SANTALUM, a genus of the m

d another planet, as the Moon e Earth.

\PA, or *Satrapes*, in Persian an- denotes an admiral. but more ly the governor of a province.

RATION, when two bodies have as much as possible of each properties, they have arrived at called the point of saturation.

REIA, *savory*, a genus of the ermia order, in the didynamia plants, and in the natural method under the 42d order, verticillatæ. e eight species.

RIUM, a genus of the diandria n the gynandria class of plants, the natural method ranking under 42d order, verticillatæ. There ecies.

ISSON, in fortification, a mass of ndles of trees bound together, ering only from a fascine, as this osed of small branches of twigs.

OUR, *Order of St.* a religious or- e Romish church, founded by St. about the year 134[illegible]; and so call- its being pretended that our himself dictated to the foundress itutions and rules.

RUS, a genus of the tetragynia n the heptandria class of plants, e natural method ranking under nd order, piperitæ. There is one

AGESIA, a genus of the monogy- er, in the pentandria class of and in the natural method rank- those of which the order is doubt- ere is one species

an instrument which serves to pieces several solid matters; as tone, ivory, &c.

FRAGA, *saxifrage*, a genus of the order, in the decandria class of and in the natural method rank- der the [illegible] order, succulentæ: re [illegible] species.

or *Saye*, in commerce, a kind of r woollen stuff, much used abroad gs, and by the religious for shirts. it is used for aprons by several artificers, being usually dyed

BIOSA, *scabious*, a genus of the mo- order, in the tetrandria class of and in the natural method rank- er the 48th order aggregatæ. re 42 species.

VOLA, a genus of the monogynia in the pentandria class of plants, re three species.

LE, a mathematical instrument, ng of several lines drawn on wood, silver, &c. and variously divided, ng to the purposes it is intended , whence it acquires various de- tions, as the plain scale, diagonal lotting scale, Gunter's scale, &c.

LE, in music, the [illegible] first the arrangement made by Guido, six syllables [illegible] [illegible] [illegible] [illegible].

MMONY, in the materia medica, eted vegetable juice of a plant of e name.

NDALUM MAGNATUM, is the name of a statute, and also of a [illegible] to any high personage of the land, as prelates, dukes, marquisses, earls, barons, and other [illegible]; as also of the chancellor, treasurer, clerk of the privy seal, steward of the house, [illegible] of the bench, and other great [illegible] of the realm, by false news or [illegible] messages, whereby any [illegible] discords, betwixt them and [illegible] or any scandal to their persons, [illegible] arise.

SCANDIX, [illegible] *Venus's comb*, [illegible] in the [illegible] order, [illegible] the natural method ranking under the 45th order, umbellatæ. There are eleven species.

SCAPEMENT, a general term for the manner of communicating the [illegible] the wheels to the pendulum [illegible].

SCAPOLITE, a mineral found [illegible] in Norway. It is of a [illegible] and is crystallized in long, [illegible] rectangular prisms. [illegible] streaked. Its specific gravity [illegible] it is hard enough to scratch glass.

SCARABÆUS, *beetle*, a genus of insects of the order [illegible]. The generic character is, antennæ [illegible] with a fissile [illegible], generally [illegible], both black and [illegible]. The species is extremely extensive, there being nearly one hundred species.

SCARIFICATION, in surgery, the operation of making several incisions in the skin by means of lancets, or other instruments, particularly the cupping instrument.

SCARLET, a beautiful bright red.

SCARUS, a genus of fishes of the order [illegible] [illegible] bony, [illegible] the edge; the teeth [illegible] and conglomerated. [illegible] species.

SCAVAGE, a toll or custom anciently exacted by mayors, sheriffs, [illegible] cities and towns corporate, [illegible] chant strangers, for wares [illegible] offered to sale within their precincts, which was prohibited by 19 Henry VII. The city of London still retains this custom.

SCENOGRAPHY, in perspective, the perspective representation of a body on a plane; or a description of it in all its parts and dimensions, such as it appears to the eye in any oblique view.

SCEPTRE, one of the new constellations of the southern hemisphere, consisting of seventeen stars.

SCHÆFFERA, a genus of the tetrandria order, in the [illegible] class of plants, and in the natural method ranking among those that are doubtful. There are two species.

SCHERARDIA, a genus of the monogynia order, in the tetrandria class of plants. The corolla is monopetalous and funnel-shaped; there are two [illegible] seeds.

SCHEUCHZERIA, a genus of the trigynia order, in the hexandria class of plants, and in the natural method ranking under the [illegible] order, tripetaloideæ. There are [illegible] species.

SCHILLER-SPAR, a mineral ranked among the species of [illegible]. Colour greyish, reddish, greenish, and yellowish white. Found massive [illegible] texture curve foliated [illegible] lustre; feels [illegible], and may be scratched by the nail. Specific gravity 27.

SCHINUS, a genus of the decandria order, in the diœcia class of plants; and in the natural method ranking under the 43rd order, dumosæ.

SCHISTUS, in mineralogy, a name given to several different kinds of stones, but more especially to some of the argillaceous kind.

SCHLEFFLERA, a genus of the class and order, pentandria decagynia. One species.

SCHMIDELIA, a genus of the digynia order, in the octandria class of plants. One species.

SCHOENUS, a genus of the monogynia order, in the triandria class of plants; and in the natural method ranking under the third order, calamariæ. 41 species.

SCHOLIUM, a note, annotation, or remark, occasionally made on some passage, or proposition, of an old author.

SCHOTIA, a genus of the monogynia order, in the decandria class of plants; and in the natural method ranking under the 33d order, lomentaceæ. One species.

SCHRADERA, a genus of the class and order hexandria monogynia. Two species.

SCHREBERA, a genus of the digynia order, in the pentandria class of plants; and in the natural method ranking with those of which the order is doubtful. One species.

SCHWALBEA, a genus of the class and order didynamia angiospermia. One species.

SCHWENKFELDIA, a genus of the monogynia order, in the pentandria class of plants; and in the natural method ranking with those that are doubtful. Three species.

SCHWENKIA, a genus of the monogynia order, in the diandria class of plants. One species.

SCIÆNA, a genus of fishes of the order thoracici. The generic character is, head scaly; dorsal fins two, seated in a furrow, into which they may occasionally withdraw, gill-membrane six-rayed.

SCILLA, the *squill*, in botany, a genus of the monogynia order, in the hexandria class of plants, and in the natural method ranking under the 10th order, coronariæ. 22 species.

SCIOPTIC, a sphere, or globe of wood, with a circular hole or perforation, wherein a lens is placed. It is so fitted that, like the eye of an animal, it may be turned round every way, to be used in making experiments in a darkened room.

SCIRE FACIAS, is a judicial writ, and properly lies after a year and a day after judgment given; whereby the sheriff is commanded to summon or give notice to the defendant, that he appear and shew cause why the plaintiff should not have execution. 1 *Inst.* 290.

SCIRPUS, a genus of the monogynia order, in the triandria class of plants, and in the natural method ranking under the third order, calamariæ. 69 species.

SCIURUS, *Squirrel*, a genus of quadrupeds of the order glires: the generic character is, upper front-teeth cuneated, lower sharp; grinders in the upper jaw five on each side, in the lower four; clavicles in the skeleton; tail (in most species) spreading towards each side.

SCIURUS, a genus of the monogynia order, in the diandria class of plants; and in the natural method ranking with those that are doubtful. One species.

SCLERANTHUS, *Knawel*, a genus of the digynia order, in the decandria class of plants, and in the natural method ranking under the 22d order, caryophylleæ. There are three species.

SCLEROCARPUS, a genus of the class and order syngenesia polygamia æqualis. There is one species.

SCLEROTICA, in anatomy, one of the tunics, or coats, of the eye.

SCOLEX, a genus of vermes intestina, two species.

SCHOLIA, a genus of insects of the order hymenoptera: 40 species.

SCOLOPAX, in ornithology, a genus belonging to the order of grallæ: the back is cylindrical, obtuse, and longer than the head; the nostrils are linear; the face is covered, and the feet have four toes. 18 species

SCOLOPENDRA, *Centipede*, a genus of insects of the order aptera: the generic character is, antennæ setaceous; body depressed; legs numerous, equalling the number of segments of the body on each side; feelers two, setaceous.

SCOLOPIA, a genus of the icosandria monogynia class and order, one species.

SCOLOSANTHUS, a genus of the class and order tetrandria monogynia, one species.

SCOLYMUS, a genus of the polygamia æqualis order, in the syngenesia class of plants, and in the natural method ranking under the 49th order, compositæ. Three species.

SCOMBER, *Mackrel*, a genus of fishes of the order thoracici: the generic character is, body oblong, smooth, sometimes carinated by the lateral line; finlets (in most species) above and below, towards the tail. 22 species.

SCOPARIA, a genus of the monogynia order, in the tetrandria class of plants, and in the natural method ranking under the 40th order, personatæ. Three species.

SCOPOLIA, a genus of the octandria order, in the gynandria class of plants; and in the natural method ranking under the 11th class, sarmentaceæ. Two species.

SCORE, in music, the original and entire draught, or its transcript, of any composition.

SCORIA, or *Dross*, is that mass which is produced by melting metals and ores, and when cold is brittle, and not soluble in water; being properly a kind of glass.

SCORING, the art of forming a score, or collecting and properly arranging under each other the several detached parts of any composition.

SCORPÆNA, a genus of fishes of the order thoracici; the generic character is, head large, aculeated, cirrhose, without scales, subcompressed; eyes placed near each other; teeth in the jaws, palate, and throat; gill-membrane seven-rayed; body fleshy; dorsal fin single, with the rays of the fore part spiny. Nine species.

RPIO, *Scorpion*, a genus of insects rder aptera; the generic character ovate-elongated; legs eight, be- wo frontal claspers; eyes eight, n each side the thorax, and two on k: tail elongated, jointed, and ted by a curved piercer, combs or l processes two, situated beneath, n the thorax and abdomen.

RPION, in the antient art of war, ne chiefly used in the defence of s of fortified places, by throwing fire-balls, or great stones.

RPIURUS, *Caterpillar*, in botany, a f the decandria order, in the dia- class of plants; and in the natu- hod ranking under the 32d order, aceæ.

RZA, a mineral of a green colour, the specific gravity of which is

ZONERA, *Viper's Grass*; a genus polygamia æqualis order, in the esia class of plants; and in the na- ethod ranking under the 49th or- ipositæ. 19 species.

BING, in joinery, &c. is a term hen one side of a piece of stuff is ted to another that is irregular.

PTURE. Writing. All profane scoff- e holy scripture, or exposing any ereof to contempt or ridicule, is ble by fine and imprisonment.

PHULARIA, *Figwort*; a genus ngiospermia order, in the didyna- s of plants; and in the natural ranking under the 40th order, per- 22 species.

PLE, a weight equal to the third drachm, or to twenty grains.

PTURE. Sculpture is an art, in by means of taking away, or add- atter, all sorts of figures are form- er in clay or wax, wood, marble r stones, or metal. The art of e, in its most extensive sense, hends not only carving in wood, r marble, but also enchasing, en- in all its kinds, and casting in or lead, wax, and plaster of Pa- ell as modeling in clay, wax, or

AGE was antiently a tax imposed as held lands, &c. by knight's towards furnishing the king's ar

ELLARIA, *scull cap*, a genus of osperma order, in the didynamia plants, and in the natural method under the 40th order, personatæ. es.

TLES, in a ship, square holes cut eck, big enough to let in the body n, serving to let people down into n below on occasion, or from one another.

LARUS, a genus of insects, ac- to Fabricius, of the order aptera; the Linnæan system it is ranked e genus cancer.

DÆA, a genus of insects of the rmes mollusca. Two species.

HROPS, a genus of birds of the cæ. There is but a single spe-

in a strict sense, signifies a large of water almost surrounded by land, as the Baltic and Mediterranean seas; but it is frequently used for that vast body of water which encompasses the whole earth. See *Ocean*.

SEAL, is either in wax, impressed with a device and attached to deeds, &c. or the instrument with which the wax is impressed.

SEALER, an officer in chancery, appointed by the lord chancellor or keeper of the great seal, to seal the writs and instruments there made in his presence.

SEALING, in architecture, the fixing a piece of wood or iron in a wall with plaster, mortar, cement, lead, and other solid binding.

SEAMEN: by various statutes, seamen having served the king for a limited time are free to use any trade or profession in any town of the kingdom, except in Oxford or Cambridge.

SEAM, or SEME *of corn*, is a measure of eight bushels.

SEAM *of glass*, the quantity of 120 pounds, or 24 stones each five pounds weight. The seam of wood is a horse load.

SEAMS *of a ship*, are places where the planks meet and join together.

SEARCHER, an officer of the customs, whose business it is to search and examine all ships outward-bound, to see whether they have any prohibited or uncustomed goods on board.

SEASIN, or SEASING, in a ship, the name of a rope by which the boat rides by the ship's side when in the harbour, &c.

SEBACIC *acid*. The acid of fat.

SEBATES, salts formed of the sebacic acids, and alkalies, earths, &c.

SECALE, *rye*, a genus of the digynia order, in the triandria class of plants; and in the natural method ranking under the 4th order, gramina.

SECANT, in geometry, is a line that cuts another, or divides it into two parts.

SECHIUM, a genus of the syngenesia order, in the monœcia class of plants, and in the natural method ranking under the 34th order, cucurbitaceæ. One species.

SECOND, in geometry, chronology, &c. the sixtieth part of a prime or minute, whether of a degree, or of an hour: it is denoted by two small accents, thus ″.

SECOND, in music, an interval of a conjoint degree.

SECONDARY, in general, something that acts as second, or is subordinate to another.

SECRETARY, an officer who, by his master's orders writes letters, dispatches, and other instruments, which he renders authentic by his signet.

SECRETION, in the animal economy, the separation of some fluid mixed with the blood by means of the glands.

SECTION, in geometry, denotes a side or surface appearing of a body or figure cut by another, or the place where lines, planes, &c. cut each other.

SECTION *of a building*, is the same with its profile; or a delineation of its heights and depths raised on a plane, as if the fabric was cut asunder to discover its inside.

SECTOR, in geometry, is a part of a circle, comprehended between two radii

SEGMENT *of a sphere*, is a part of a sphere terminated by a portion of its surface, and a plane which cuts it off, passing somewhere out of the centre; being more properly called the section of a sphere.

SEGUERA, in botany, a plant belonging to the class of polyandria and the order of monogynia.

SEIGNIORY, *dominium* in our law, is used for a manor or lordship of a seigneur, or lord of the fee or manor.

SEIGNORAGE, signifies the right, or due belonging to a seigneur, or lord: but it is particularly used for a duty belonging to the prince, for the coining of money, called also coinage; which under our antient kings was five shillings for every pound of gold brought in the mass to be coined, and a shilling for every pound weight of silver. At present the king claims no seignorage at all.

SEISIN, in law, signifies possession.

SEIZE, SEAZE, or **SEASE**, in the sea-language, is to make fast, or bind, particularly to fasten two ropes together with rope-yarn.

SEIZURE, in commerce, an arrest of some merchandize, moveable, or other matter, either in consequence of some law, or of some express order of the sovereign.

SELAGO, a genus of the angiospermia order, in the didynamia class of plants; and in the natural method ranking under the 48th order, aggregatæ.

SELENITES, in natural history, the name of a large class of fossils, the characters of which are these: they are bodies composed of slender and scarcely visible filaments, arranged into fine, even, and thin flakes; and those disposed into regular figures in the several different genera, approaching to a rhomboid or hexangular column, or a rectangled parallelogram; fissile, like the talcs, but they

also window-soil, i
a window-frame.

SEMECARPUS,
order, in the pent
There is but one sp

SEMEN, a substa
ture for the reprodu
of the species both
The peculiar liqu
of males, and desti
tion of females, is
of semen.

SEMEN, in botan
of the fruit of eve
are 1000 seeds in e
in a single tobacco
enumerated. Linna
the eggs of plants.

SEMI-CIRCLE,
circle, or that figu
tween the diamete
the circumference.

SEMI-COLON,
the points or stops
several members o
other (;).

SEMI-CUBICAL
higher geometry, a
order, wherein the
are as the squares o

SEMI-DIURNAL
cles which the sun
each daily revolutio
is above the horizo
arch, and that whic
is called the noctu
of which are called
the semi-nocturnal

SEMI-PELAGIA
a branch of the pe
cause they pretende
between the pela
dox.

SEMPERVIVUM
plants belonging to
gynia, and in the

the contraction of which the
ays fast hold of any thing. Be-
ie eight arms, it has two tentacula
an the arms, and frequently pre-
ed The mouth is situated in
e of the arms, and is horney and
The eyes are below the tenta-
rards the body of the animal.
r is fleshy, and received into a
far as the breast. Their food
ies, sprats, lobsters, and other
With their arms and trunks
n themselves, to resist the mo-
ie waves. Their beak is like
parrot. The females are distin-
y two paps. This animal was
a delicacy among the ancients;
len at present by the Italians.

RIA, (from sepes, a hedge), the
the 44th order of Linnæus's
s of a natural Method, consist-
beautiful collection of woody
me of which, from their size and
are very proper furniture for

RIÆ, in natural history, a large
ossils, commonly known by the
f ludus helmontii and waxen

S, a genus of plants belonging
ner of heptagynia, and the class
ndria, and in the natural system
nder the 13th order succulentæ.

STRATION, is the separating or
nde of a thing in controversy
possession of both those who
or it. A sequestration is also a
execution for debt, especially in
of a beneficed clerk, of the pro-
benefice to be paid over to him
re judgment till the debt is sa-

IAS, a genus of plants belonging
er of diandria, and to the class
dria, and in the natural system
under the 7th order, orchideæ.

, in commerce, a woollen stuff
tured in a loom, of which there
ous kinds, denominated either
r different qualities, or from the
here they are wrought; the most
ible of which is the London
ich is highly valued abroad.

ANT, or SERJEANT, at law, is
st degree taken in that profes-
at of doctor is in the civil law.
serjeants, as men of great learn-
xperience, one court is set apart
to plead in by themselves which
urt of common pleas, where the
law of England is most strictly
; yet though they have this court
ives, they are not restrained
ding in other courts.

are also serjeants-at-arms, whose
o attend on the person of the
arrest persons of condition of-

ANT, or *Serjeant*, in war, is an
fficer in a company of foot, or
dragoons armed with a halberd,
inted to see discipline observed,
he soldiers the exercise of their
l to order, straighten, and form,
s, &c.

ANTY, signifies in law a service
ot be due from a tenant to any

lord, but to the king only; and it is either grand serjeanty, or petit serjeanty.

SERIES, in general, denotes a continued succession of things in the same order, and having the same relation or connection with each other.

SERIES, *infinite*, is a series consisting of an infinite number of terms, that is, to the end of which it is impossible to come; so that let the series be carried on to any assignable length, or number of terms, it can be carried yet farther, without end or limitation.

SERIOLA, a genus of plants belonging to the order of polygamia æqualis, and to the class of syngenesia, and in the natural system ranged under the 49th order, compositæ. The receptacle is paleaceous.

SERIPHIUM, a genus of plants belonging to the order of monogamia, and to the class of syngenesia.

SERPENTES, in natural history, an order of the amphibia class, the characteristics of which are, a mouth breathing by the lungs only; body tapering, neck not distinct; jaws dilatable, not articulate; no feet, fins, or ears: motion undulatory.

SERPENTINE, a mineral found in amorphous masses, forming strata, and even entire mountains. Its fracture is splintery, sometimes conchoidal.

SERPULA, a genus of insects of the order vermes testacea.

SERRATULA, *saw wort*, a genus of plants belonging to the class of syngenesia, and to the order polygamia æqualis. In the natural system it is ranged under the 49th order, compositæ.

SERROPALPUS, a genus of insects of the order coleoptera: the generic character is, antennæ setaceous; feelers four, unequal; the anterior ones longer, deeply serrate, composed of four joints, the last joint very large, truncate, compressed, patelliform; the posterior ones subclavate; thorax margined, concealing the head, with a prominent angle on each side; head deflected; feet formed for leaping.

SERTULARIA, in natural history, a genus belonging to the class of vermes, and to the order zoophyta.

SERVICE, in law, is a duty which a tenant, on account of his fee, formerly owed to his lord.

SERUM, a thin transparent liquor, which makes a considerable part in the mass of blood.

SESAMUM, *oily grain*, a genus of plants belonging to the class of didynamia, and to the order of angiospermia, and in the natural system ranking under the [illegible] order, luridæ.

SESELI, *meadow saxifrage*, a genus of plants belonging to the class of pentandria, and to the order of digynia, and in the natural system ranging under the 45th order, umbellatæ.

SESSION, in law, denotes a sitting of justices in court upon their commission; as the session of oyer and terminer, &c.

SESSIONS, *quarter*. The session of the peace is a court of record holden before two or more justices of the peace, whereof one is of the quorum, for the execution of the authority given them by the commission of the peace, and certain statutes and acts of parliament.

SESUVIUM, a genus of plants belonging to the class of icosandria, and to the order of trigynia.

SETTING, in the sea-language. To set the land or the sun by the compass, is to observe how the land bears on any point of the compass, or on what point of the compass the sun is. Also when two ships sail within sight of one another, to mark on what point the chased bears, is termed setting the chase by the compass.

SEWER, a passage or gutter made to carry water into the sea or a river, whereby to preserve the land, &c. from inundations and other annoyances. The business of the commissioners of sewers, or their office in particular, is to repair sea-banks and walls, survey rivers, public streams, ditches, &c. and to make orders for that purpose.

SEX, something in the body which distinguishes male from female, and is common to both plants and animals.

SEXANGLE, in geometry, a figure having six sides, and consequently six angles.

SEXTANS, a sixth part of certain things.

SEXTANT, in mathematics, denotes the sixth part of a circle, or an arch comprehending sixty degrees.

SEXTON, a church-officer, whose business is to take care of the vessels, vestments, &c. belonging to the church, and to attend the minister, churchwardens, &c. at church.

SEXTUPLE, *sestuplo*, in music, denotes a mixed sort of triple which is beaten in double time, now called compound common time.

SHADOW, in optics, a privation or diminution of light, by the interposition of an opake body; or it is a plane where the light is either altogether obstructed, or greatly weakened, by the interposition of some opake body between it and the luminary.

SHAFT *of a column*, in building, is the body thereof between the base and capital, so called from its straightness.

SHAGREEN, or CHAGREEN, in commerce, a kind of grained leather, prepared, as is supposed, of the skin of a species of squalus, or hound-fish, called the shagree, or shagrain, and much used in covering cases, books, &c.

SHAMMY, or CHAMOIS LEATHER, a kind of leather dressed either in oil or tanned, and much esteemed for its softness, pliancy, and being capable of bearing soap without hurt.

SHARP, in music, a character, the power of which is to raise the note before which it is placed half a tone higher than it would be without such a preposition.

SHAWIA, a genus of the class and order syngenesia polygamia segregata.

SHEATHING, in the sea language, is the casing that part of a ship which is to be under water, with fir-board of an inch thick; first laying hair and tar, mixed together, under the boards, and then nailing them on, in order to prevent worms from eating the ship's bottom.

SHEEP. See Ovis.

SHEERING, or SHEARING, in woollen manufacture, is the cutting off with large sheers the too long nap, in order to make the cloth more smooth and even.

SHEERS, in a ship, are two masts set across at the upper end of each other; a contrivance generally used for setting or taking out the masts of a ship, where there is no hulk to do that office.

SHEFFIELDIA, a genus of plants belonging to the class of pentandria, and to the order of monogynia.

SHEKEL, in Jewish antiquity, an ancient coin, worth 2s. 3½d. sterling.

SHELF, among miners, the same with what they otherwise call fast ground, or fast country; being that part of the internal structure of the earth, which they find lying even and in an orderly manner.

SHELL. A substance compounded of carbonate of lime variously combined with animal gluten, and serving for the coverings and habitations of different animals.

SHERRADIA, a genus of the monogynia order, in the tetrandia class of plants, and in the natural method ranking under the 47th order, stellatæ.

SHERIFF. As keeper of the king's peace, the sheriff is the first man in the county, and superior in rank to any nobleman therein, during his office. He may apprehend and commit to prison all persons who break the peace, or attempt to break it, and may bind any one in a recognizance to keep the king's peace. He may, and is bound ex officio, to pursue and take all traitors, murderers, felons, and other misdoers, and commit them to gaol for safe custody.

SHIELD, an ancient weapon of defence, in the form of a light buckler, borne on the arm, to turn off lances, darts, &c.

SHIELD, in heraldry, the escutcheon or field on which the bearings of coats of arms are placed.

SHILLING, an English silver coin.

SHINGLES, in building, small pieces of wood, or quartered oaken boards, sawn to a certain scantling, or, as is more usual, cleft to about an inch thick at one end, and made like wedges, four or five inches broad, and eight or nine inches long.

SHIP, a general name for all large vessels, particularly those equipped with three masts and a bowsprit; the masts being composed of lower-mast, top-mast, and top-gallant-mast; each of these being provided with yards, sails, &c.

SHIPS *of war* are vessels properly equipped with artillery, ammunition, and all the necessary martial weapons and instruments for attack or defence. They are distinguished from each other by their several ranks or classes, called rates, as follows: ships of the first rate mount from 100 guns to 110 guns and upwards; second rate, from 90 to 98 guns; third rate, from 64 to 74 guns; fourth rate, from 50 to 60 guns; fifth rate, from 32 to 44 guns; and sixth rate, from 20 to 28 guns.

Vessels carrying less than 20 guns, are denominated sloops, cutters, fire-ships, and bombs.

Ships are also sometimes named accord-ifferent modes of their con- Thus we say, a cat-built ship,

ILDING may be defined, the constructing ships, or the as distinguished from naval , which may be considered y or art of delineating ships on

, or SHIEVERS, in the sea- ames given to the little rollers heels of pulleys.

covering for the foot, usually ther, by the company of cord-

r an anchor, in a ship, the place nor to rest, and fitted to re- ck, &c. so as to prevent the , and other running-rigging , or being entangled with the

NG, in the military art. See *nnery*, and *Projectile*.

NG, in sportsmanship, the me by the gun, with or with- t of dogs

No word has been used by ts with less limitation than as first introduced into mine- ronstedt, to denote any stone nar form, considerable hard- specific gravity from 3 to 3.4. *ack*, Colour black. Found sseminated and crystallized. ee-sided prisms, having their s truncated. Sometimes ter- a pyramid. Lateral faces striated. Vitreous. Fracture Opaque. Scratch grey. Specific gravity from 3 to [illegible] *le ore*. This stone was first [illegible] in Europe by specimens n Ceylon; but it is now found [illegible] forming a part of the [illegible] ntains. It is sometimes in pieces, but [illegible] s [illegible] four-sided summits.

l, a stone which received its Mr. Klaproth, is generally long masses, which, when re- six-sided prisms, inserted in

TAND. See *Stenography*.

den [illegible] given to [illegible] fire-arms; those [illegible] n, and those for guns, pistols, l.

in ecclesiastical history, a case [illegible] the relics of some saint.

s, or *shrouds*, in a ship, are the [illegible] down both sides s, and are fastened below to [illegible] and [illegible] to e mast; being parcelled and [illegible] to prevent the mast's fal

[illegible] in the manufactures, an in- [illegible] used by weavers. [illegible]

[illegible]

RIA, a genus of plants be-longing to the class of didynamia, and to the order of angiospermia; and in the natural system classed with those the order of which is doubtful.

SICE-ACE, a game with dice and tables, wherein five may play; each having six men, and the last out losing. At this game, they lose one another with great [illegible]; and [illegible] drinks, and throws again.

SICYOS, a genus of plants belonging to the class of monoecia, and to the order of syngenesia; and in the natural system arranged under the 34th order, cucurbitaceae.

SIDA, yellow or Indian mallow, a genus of plants belonging to the class of monadelphia, and to the order of polyandria; and in the natural system ranking under the 37th order, columniferae.

SIDERIA, in natural history, the name of a genus of crystals, used to express those altered in their figures by particles of iron.

SIDERITE, a substance discovered by Mr. Meyer and by him supposed to be a new metal, but Messrs. Bergman and Kirwan discovered that it is nothing else than a natural combination of the phosphoric acid with iron.

SIDERITIS, *Ironwort*; a genus of plants belonging to the class of didynamia, and to the order of gymnospermia, and in the natural system ranging under the 42d order, verticillatae.

SIDEROXYLUM, *Iron-wood*; a genus of plants belonging to the class of pentandria, and to the order of monogynia; and in the natural system ranging under the 43d order, dumosae.

SIEGE, in the art of war, the encampment of an army before a fortified place, with a design to take it.

SIGESBECKIA, a genus of plants belonging to the class syngenesia, and to the order of polygamia superflua, and in the natural system ranging under the 49th order, compositae.

SIGHTS, of a *quadrant*, &c. thin pieces of brass, raised perpendicularly on its side, or on the index of a theodolite, circumferentor, &c.

SIGN, in astronomy, a constellation containing a twelfth part of the zodiac, or 30 degrees.

SIGN-MANUAL, in law, is used to signify [illegible] writing signed by the king's own hand [illegible] writing.

SIGNALS, certain alarms or notices used to communicate intelligence to a distant [illegible]

SIGNATURE, in printing, is a letter put at the bottom of the first page at least, in each sheet, as a direction to the binder, in folding, gathering, and collating them.

SIGNET, one of the king's seals, made use of in sealing his private letters, and all grants that pass by bill signed under his majesty's hand.

SILENE, catchfly or *viscous campion*, a genus of plants belonging to the class of decandria, and order of trigynia, and in the natural system arranged under the 22d order, caryophylleae.

SILICA, one of the most important of the earths. It is the chief ingredient of those stones which seem to constitute the basis of this terrestrial globe. It is a sential ingredient in mortar, in all kinds of stone ware, and in glass.

SILK, in natural history, is the production of different species of caterpillars. The phalæna, or bombyx mori, is most commonly propagated for that purpose in Europe; but the phalena atlas yields a greater quantity.

SILPHA, a genus of insects of the order coleoptera. The generic character is, antennæ thickening towards the tip; wing-sheaths margined; head prominent; thorax flattish, margined.

SILPHIUM, a genus of plants belonging to the class of syngenesia, and to the order of polygamia necessaria; and in the natural system arranged under the 49th order, compositæ.

SILVER, in natural history, is a metal of a fine white colour, without either taste or smell; and in point of brilliancy perhaps inferior to none of the metallic bodies, if we except polished steel.

SILVERING. The art of silvering wood, paper, &c. is performed in the same manner as gilding, making use of silver instead of gold leaf.

SILURUS, a genus of fishes of the order abdominales. The generic character is, head large, depressed; mouth wide, bearded by long tentacula; body lengthened, naked; first ray of the pectoral fins, or of the first dorsal fin, toothed backwards. There are 28 species.

SIMIA, ape, a genus of quadrupeds of the order primates. The Linnean generic character is, front teeth in each jaw four, placed near together; canine teeth solitary, longer than the others, distant from the remaining teeth, or grinders; grinders obtuse.

SIMILAR, in arithmetic and geometry, the same with like.

SIMILAR FIGURES, in geometry, such as have their angles respectively equal, and the sides about the equal angles proportional.

SIMONIANS, in church history, a sect of antient christians, so called from their founder, Simon Magus, or the magician. The heresies of Simon Magus were principally his pretending to be the great power of God, and thinking that the gifts of the Holy Spirit were venal.

SIMONY, is the corrupt presentation of any one to an ecclesiastical benefice, for money, gift, reward, or benefit.

SIMOOM. A wind or haze was observed by Mr. Bruce, in the course of his travels to discover the sources of the Nile, which is supposed to be in some respects analogous to the sirocco. It is called by Mr. Bruce the simoom, and from its effects upon the lungs, we can entertain but little doubt, that it consists chiefly of carbonic acid gas in a very dense state, and perhaps mixed with some other noxious exhalations.

SIMPLE, in music, a term applied to that counterpoint in which note is set against note, and which is called simple, in opposition to the more elaborate composition, known by the name of figurative counterpoint.

SINAPIS, *mustard*, a genus of plants belonging to the class of tetradynamia, and to the order of siliquosa, and in the natural system ranged under the 39th order, siliquosæ.

SINCIPUT, in anatomy, the fore part of the head, reaching from the forehead to the coronal suture.

SINE, or *right sine of an arch*, in trigonometry, is a right line drawn from one end of that arch, perpendicular to the radius drawn to the other end of the arch; being always equal to half the chord of twice the arch.

SINE-CURE, is where a *rector* of a parish has a vicar under him endowed and charged with the cure, so that the rector is not obliged either to do duty or residence.

SINKING FUND, in political economy, a portion of the public revenue appropriated to the reduction or discharge of the public debts.

SINNET, on board a ship, a line or string made of rope-yarn, consisting generally of two, six, or nine strings, which are divided into three parts, and are platted over one another, and then beaten smooth and flat with a wooden mallet.

SIPHON, or *Syphon*, in hydraulics, a bended pipe, having the air sucked out of it, and with one end placed in a vessel containing any liquid, is used to draw off the liquor at the other.

SIPHONANTHUS, a genus of the tetrandria monogynia class and order. The corolla is one-petalled, very long, funnel-form, inferior; berries four, one-seeded.

SIPHONIA, a genus of the class and order monœcia monadelphia.

SIPONCULUS, or *tube-worm*, a genus of insects of the order vermes intestina; the generic character is, body round, elongated; mouth cylindrical at the end, and narrower than the body; aperture at the side of the body, and verruciform.

SIREN, a genus of amphibia, of the order reptiles, generic character: body naked, with two feet, and without a tail; feet with arms and nails.

SIREX, a genus of insects of the hymenoptera order. The generic character is, mouth with two strong jaws; feelers two, truncated; antennæ filiform, with more than twenty-four joints; sting exserted, stiff, serrated; abdomen sessile, pointed; wings lanceolate, flat in all.

SIRIUS, the *Dog-star*; a star of the first magnitude; and is the brightest of all the stars in our firmament.

SIRIUM, a genus of plants belonging to the class of tetrandria and order of monogynia.

SIROCCO, a periodical wind which generally blows in Italy and Dalmatia, every year about Easter.

SISON, *bastard stone-parsley*, a genus of plants belonging to the class of pentandria, and to the order of digynia; and in the natural system arranged under the 45th order, umbellatæ.

SISYMBRIUM, *water-cresses*, a genus of plants belonging to the class of tetradynamia, and to the order of siliquosa; and in the natural system ranged under the 39th order, siliquosæ.

SISYRINCHIUM, a genus of plants belonging to the class of monadelphia, and order of triandria; and in the natural d under the fth order,

atch, a genus belonging to
s, and order of picæ. The
most part straight; on the
e there is a small angle,
covered with bristles re-
em: tongue short, horny at
ragged; toes placed three
ne backward, the middle
ly at the base [illegible]
to as large as the middle
e eleven species.

f [illegible], a genus of plants
e class of pentandria
, and in the natural sys-
nder the [illegible]th order, um-

ne of an instrument used
s for fine round pearls.
a sort of glue used by

all the bones of a dead ani-
cleansed, and disposed in
uation.
genus of the monogynia
trandria class of plants, and
method ranking under the
[illegible].
ntis.
ne who works in stone.
part of the head which
bony cavity.
e expanse of air and at-

tside sappy plank or board
the sides of a timber tree,
used for a flat piece of

a stone constitutes a part
ains. Its structure is slaty.
ated. Fracture splintery.
in tabular. Lustre most
y.
The law of England ab-
not endure, the existence
in this nation. A slave or
lent his lands in England,
protection of the laws, and
man.
kind of carriage without
conveyance of very weighty
ge stones, &c.
in a ship, timbers lying
in the bottom of the ship,
ails on; the lowermost of
to the ring-heads, and
to the futtocks and rungs.
is used variously at sea,
the hoisting up casks, or
ings, viz. slings.
a genus of plants belonging
pentandria, and order of
in the natural system
r the 40th order, amen-

Sloth. See *Bradypus.*
as sylvestris, the English
tal plum.
rt of small ship or vessel,
ne mast, otherwise called
In the navy sloops are tenders
of war, and are usually of
ns, and carry about thirty

nd auls, a frame of tim-
b[illegible] serving to retain

and raise the water of the sea, a river, &c. and on other such like purposes.

SMELT, a kind of grey stone, a dark like colour, which when levigated, appears of a most beautiful colour.

SMARAGDITE, in mineralogy. This stone was called smaragdite by M. Saussure, from its resemblance which it has to the emerald. Never crystallized. Its texture is foliated. Easily divided into plates. Its laminæ are flexible. Fracture even. Specific gravity 3.

SMELTING, in metallurgy, the fusion or melting of the ores of metals, in order to separate the metalline part from the earthy, stony, and other parts.

SMILAX, *rough bindweed*, a genus of plants belonging to the class of diœcia, and order of hexandria; and in the natural system ranging under the 11th order, sarmentaceæ.

SMITHERY, or *Smithing*, a manual art by which an irregular lump of iron is wrought into an intended shape.

SMITHIA, a genus of the decandria order, in the diadelphia class of plants; and in the natural method ranking under the 32d order, papilionaceæ.

SMUT, a disease in corn which destroys entirely the germ and substance of the grain.

SMYRNIUM, *Alexanders*; a genus of plants belonging to the class of pentandria, and to the order of digynia; and in the natural system ranging under the 45th order, umbellatæ.

SNAIL. See *Helix*, and *Limax*.

SNAKE. See *Angui*

SNIPE. See *Scolopax*.

SOLE-FISH. See *Pleuronectes*.

SNOW, a well-known substance, formed by the freezing of the vapours in the atmosphere.

SNOWDROP. See *Galanthus*.

SNOWDROP-TREE. See *Chionanthus*.

SNUFF, a powder chiefly made of tobacco, the use of which is too well known to need any description here.

SOAP, a composition of caustic fixed alkali, salt and oil, or other grease.

SOCAGE, an antient tenure, by which lands were held on condition of ploughing the lord's lands, and doing the operations of husbandry, at their own charges.

SOCCUS, in antiquity, a kind of high shoe, reaching above the ancle, worn by comedians, as the cothurnus was by tragedians.

SOCINIANS, in church history, a sect of christians, so called from their founder Faustus Socinus, a native of Sienna, in Italy. He, about the year 1574, began openly to declare against the Roman catholic faith, and taught, 1. That the eternal father was the one only God, that the Word was no more than an expression of the godhead, and had not existed from all eternity; and that Jesus Christ was God no otherwise than by his superiority above all creatures, who were put in subjection to him by the Father. 2. That Jesus Christ was not a mediator between God and men, but sent into the world to serve as a pattern of their conduct; and that he ascended up to heaven only to take a journey thither. 3. That the punishment of hell

SOLANUM, a genus of the mo
order, in the pentandria class of
and in the natural method ranking
the 28th order, luridæ.

SOLDANELLA, in botany, a g
plants of the class of pentandri
order of monogynia, and in the
system arranged under the 21
precæ.

SOLDER, *Sodder*, or *Soder*, a
or mineral composition used in so
or joining other metals. Sold
made of gold, silver, copper,
muth, and lead; usually observi
in the composition there shall b
of the metal that is to be soldere
with some higher and finer metals

SOLDERING, the joining and
ing together of two pieces of
metal, or of two different me
the fusion and application of so
tallic composition, on the extre
metals to be joined.

SOLICISM, *solœcismus*, in g
a false manner of speaking, con
the use of language and the rules
mar, either in respect of declensi
jugation, or syntax.

SOLEN, *razor sheath*, or *kni*
shell, a genus belonging to the
vermes, and order of testacea. T
mal is an ascidia. The shell is
oblong, and opening at both sid
hinge has a tooth shaped like
bent back, often double, not
into the opposite shell; the ri
sides somewhat worn away, a
horny cartilaginous hinge.

SOLIDAGO, *golden rod*, a g
plants, of the class of syngenesia
order of polygamia superflua, a
natural system ranging under
order of compositæ.

SOLICITOR, a person emp
take care of, and manage, suits de
in the courts of equity.

r that which fills the inter-
between the lines that ter-

echanics, the line a move-
nsidered as a point, is
scribe by its motion.
easure taken from the
the thumb's end and the
finger, when both are
The span is estimated at
s, or 9 inches.
neralogy, a name given
which break easily into
bu l, or laminated frag-
shed surfaces.
M, *bur reed*, a genus of
g to the class of monœcia,
of triandria, and in the
ranged under the 3d order,

HIN, a mineral found in
it forms whole mountains,
rts of Germany, and in
sometimes amorphous, and
tallized.
A, a genus of plants be-
lass of polyandria, and to
nogynia.
See *Fringilla*.
HAWK See *Falco*.
broom, a genus of plants
e class of diadelphia, and
dria, and in the natural
ed under the 32d order,
The stigma is longitudinal
ve, the filaments adhere
The calyx is produced
There are 27 species.
genus of fishes of the order
generic character is, the
ro t teeth in some species
single row, in others in a
or quadruple row: grinders
s) convex, smooth, and dis-
s, forming a kind of pave-
outh: lips thick; gill-covers
oth, scaly.
, a genus of plants belong-
s of pentandria, and to the
ia.
an instrument used by sur-
pothecaries for spreading

algebra, the characters or
use of to represent quanti-

in medicine, a remedy
and effect is peculiarly
me certain disease, is ade-
, and exerts its whole force
hereon.
ARITHMETIC, the same

IS LAPIS, in natural history,
s, composed of large plates
ite, and of extreme thin-
ch fissile again separated
r of plates still finer.
l, a *looking-glass* or *mirror*,
lecting the rays of the sun,

l, in surgery, an instrument
wound, or the like, in or-
e it attentively.
L. See *Fringilla*.
, *spurrey*, a genus of plants
he class of decandria, and
entagynia, and in the natu-
ral system arranged under the 22d order, caryophylleæ.

SPERMACETI. This peculiar oily substance is found in the cranium of the physeter macrocephalus, or spermaceti-whale. It is obtained also from some other species.

SPERMACOCE, *button-wood*, a genus of plants belonging to the class of tetrandria, and order of monogynia, and in the natural system arranged under the 47th order, stellatæ.

SPHÆRANTHUS, a genus of plants belonging to the class of syngenesia, and to the order of polygamia segregata; and in the natural system arranged under the 49th order, compositæ.

SPHÆRIA, a genus of the class and order cryptogamia fungi. The fructifications are mostly spherical, opening at the top; while young filled with jelly, when old with blackish powder. They grow on the bark or wood of other plants.

SPHÆROCARPUS, a genus of the cryptogamia class of plants, and order algæ, consisting of foliaceous matter, expanded on the ground, and producing very large and obvious fructifications.

SPHAGNUM, *bog-moss*, a genus of plants belonging to the class of cryptogamia and order of musci. The antheræ are globose; the mouth entire, and closed by an operculum; the calyptra is wanting.

SPHERE, is a solid contained under one uniform round surface, such as would be formed by the revolution of a circle about a diameter thereof as an axis.

SPHERE, in astronomy, that concave orb, or expanse, which invests our globe, and in which the heavenly bodies appear to be fixed, and at an equal distance from the eye.

SPHERICS, the doctrine of the sphere, particularly of the several circles described on its surface, with the method of projecting the same on a plane.

SPHEROID, a solid body approaching to the figure of a sphere, though not exactly round, but having one of its diameters longer than the other.

SPHEX, a genus of insects of the order hymenoptera. The generic character is, mouth with jaws, without tongue; antennæ of ten jaws; wings flat-incumbent (not pleated) in each sex; sting concealed.

SPHINX, the hawk moth, a genus of insects of the order lepidoptera. The generic character is, antennæ thickest in the middle, subprismatic, and attenuate at each extremity; wings deflected; flight strong, and commonly in the evening or morning.

SPICA VIRGINIS, a star of the first magnitude, in the constellation Virgo.

SPIDER. See *Aranea*.

SPIELMANNIA, a genus of the didynamia angiospermia class and order.

SPIGELIA, *worm-grass*, a genus of plants belonging to the class of pentandria, and order of monogynia; and in the natural system arranged under the 47th order, stellatæ.

SPIKING *up the ordnance*, a sea-phrase, used for fastening a quoin with spikes to the deck close to the breech of the carriages of great guns, that they may keep close and firm to the ship's sides, and

is the tetrahedron.
of its crystals is a
composed of two
applied base to bas
of which is an equila

SPINET, or *Spinnet*
ment ranked in the
among harmonious i

SPINIFEX, a genu
to the class of poly
diœcia.

SPINNING, the a
flax, hemp, hair, w
into thread.

SPINSTER, in law,
given to all unma
viscount's daughter

SPIO, a genus of
mollusca. The gen
projecting from a tu
nished with dorsal
feet rough with bri
wards the back; fe
ple; eyes two, oblo

SPIRACULA, in
pores on each side
the abdomen, thr
breathe.

SPIRÆA, a genus
to the class of icosa
der of pentagynia
system arranged u
pomaceæ.

SPIRAL, in geom
the circular kind, w
recedes from its cen

SPIRAL, in archite
implies a curve th
about a cone or spire
thereof continually

SPIRALE, *proporti*
lines as the rhumb-li
globe.

SPLACHNUM, a
longing to the class
order of musci.

RE, *hollow*, is a body of foot
p, with an empty space in the
or the colours, drums, and bag-
ing every way to resist the charge
se.
RE, *oblong*, a square which is not
angles, but represents the figure
long, whose sides are unequal.
RE, *perfect*, a square whose sides
l and at right angles.
HYS, a genus of plants belonging
ss of didynamia, and order of gymno-
ia; and in the natural system ar-
der the 42d order, verticillatæ.
.UM, an ancient Greek long mea-
al a furlong.
ILLINA, a genus of plants be-
to the class of syngenesia, and or-
olygamia æqualis; and in the
ystem arranged under the 49th
mpositæ.
ACTITÆ, or *Stalactogni*, stony
es resembling icicles, or natural
or crystalline spars formed into
conical, round, or irregular bo
aposed of various crusts, and
found hanging in form of icicles
roofs of grottoes.
AGMITIS, a genus of the monœ-
, in the polygamia class of plants.
e natural method ranking under
order, [illegible].
NA, in the animal body, are
to be those simple original parts
xisted first in the embryo.
DARD, in commerce, the original
ght, measure, coin, committed
eping of a magistrate, or depo-
me public place, to regulate, ad-
d try, the weights used by parti-
rsons in traffic.
DARD, in military affairs, a mea-
which men enlisted into his ma-
ervice, have the regulated height
ed.
DARD, in war, a sort of banner
ed as a signal for the joining
of the several troops belonging
ne body.
DING, in the sea-language. Stand-
of the sheets, is that part of it
made fast to a ring at the ship's
standing part of a tackle, is the
e rope where the block is fasten-
ding ropes, are those which do
n any block, but are set tawt or
as occasion serves; as the shee-
ack-stays, or the like.
GEN-PATH, a spar of baryte
colour white; sometimes grey.
en, always crystallized. The
are six-sided prisms terminated
ded or four-sided summits, or
prisms terminated by two sided
. Crystals very small and small,
clusters. Longitudinal fracture,
ross, fracture even, [illegible].
NARIES, the mines and works
a ding are purified, as in Corn-
von-hire, &c.
LIA, a genus of the pentandria
class of plants, the corolla whereof
is of a large, fine, single petal,
far beyond the nectary, the fruit
of two oblong [illegible] follicles,
[illegible]
ed; the seeds [illegible];
[illegible]

STAPHYLEA, *Bladder-nut*, a genus of plants, belonging to the class of pentandria, and order of trigynia; and in the natural system arranged under the 23d order, trihilatæ.

STAPHYLINUS, a genus of insects of the order coleoptera: the generic character is, antennæ moniliform; wing-sheaths halved, wings covered; tail simple, protruding occasionally two oblong vesicles.

STAPLE, primarily signifies a public place or market, whither merchants, &c. are obliged to bring their goods to be bought by the people. The staple-commodities of this kingdom are said by some to be these, viz. wool, leather, woolfells, lead, tin, butter, cheese, cloth, &c. but others allow only the first five to be staple-commodities.

STAR, in astronomy, a general name for all the heavenly bodies, which are dispersed through the whole heavens.

STARS, *falling*, in meteorology, meteors which dart through the sky in form of a star.

STAR. See *Heraldry*.

STAR, in pyrotechny, a composition of combustible matters, which, being thrown aloft in the air, exhibits the appearance of a real star.

STARBOARD, in the sea language, denotes the right-hand side of a ship.

STAR-SHOT, a gelatinous substance frequently found in fields, and is the remains of the food of herons, sea-mews, and the like birds, for these birds, when shot, have been found to disgorge a substance of the same kind.

STAR-STONE, asteria, in natural history, a name given to certain extraneous fossil stones, in form of short, and commonly somewhat crooked, columns, composed of several joints; each resembling the figure of a radiated star, with a greater or smaller number of rays in the different species.

STARCH. If a quantity of wheat-flour is formed into a paste, and then washed under a very small stream of water, kneading continually till the water runs off without colouring, the flour by this process is divided into two distinct constituents. A tough substance of a greyish-white colour, called gluten, remains in the hand, the water is at first milky; but soon deposits a white powder, which is known by the name of starch.

STATICE, *Thrift*, a genus of plants belonging to the class of pentandria, and order pentagynia; and in the natural system ranging under the [illegible] order, aggregatæ.

STATICS, that branch of mathematics which considers the motion of bodies arising from gravity.

STATISTICS, a word lately introduced to express a view or survey of any kingdom, county, or parish.

STATUARY, a branch of sculpture, employed in the making of statues.

STATUES, are figures, representing [illegible] creatures, [illegible] and [illegible] full relievo, insulated on every side. Statues are [illegible] with the [illegible] several [illegible], they are [illegible]

clerks of the statute
mayor of the city of
chants of the said c
assigned, or before t
of the town, or oth
that purpose assigne

STATUTE STAPL
acknowledged befo
staple, in the prese
the constables. But
as well as statute me
measure become obs

STATUTES, or S
wise called petit se
in every hundred, of
land, where by custo
used, whereto the co
both house-holders,
for the debating of
masters and servant
vants' wages, and be
in service, as being
fuse to seek or get m

STAVE, in music,
and parallel lines on
the notes are placed.

STAUROLITE, in
stone has been found
the Hartz. It is cr
form of its crystals has
gists to give it the na
Its crystals are two
prisms, terminated b
mids, intersecting each
gles; the plane of
longitudinally through
times these prisms oc
mitive form, an octahe
triangular faces. The
tals striated longitudin

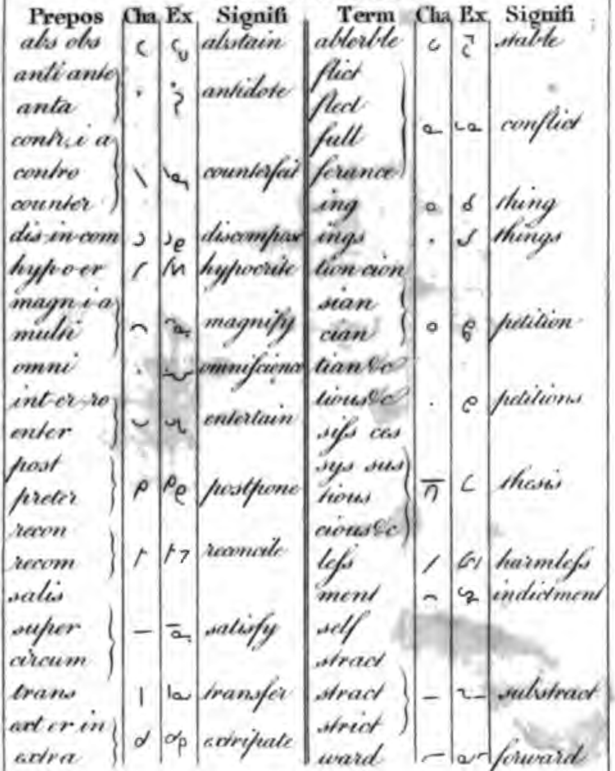
STAY, in the sea-
rope fastened to the to
to the foot of that next
the prow, serving to
prevent its falling aft
the point.

d	)	do, did	thr
e	ˎ	ever, every, mid	str
f	⌣	from, if	wh
g j	σ	God, give, gives	
h	ſ	he, had, his	V
i	,	I, eye, below	
k	\	king, know	h
l	/	Lord, will, all	d
m	⌒	me, my, most	f
n	⌣	and, in, nature	g
o	.	O, oh, owe, above	h
p	ρ	people, peace	k
q	‿	ques.^{tn} quantity	tr
r	ɼ	or, are	m
s	—	is, us, soon	n
t	|	the, to, it	p

STENOGRAPHY.

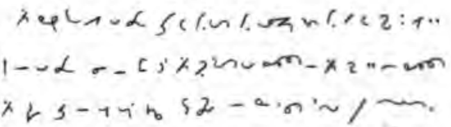
according to Mavor.

THE PREPOSITIONS and TERMINATIONS



Prepos	Cha	Ex	Signifi	Term	Cha	Ex	Signifi
abs obs			*abstain*	*ablorble*			*stable*
anti ante			*antidote*	*flict*			
anta				*flect*			*conflict*
contr-i-a				*full*			
contro			*counterfai*	*ferance*			
counter				*ing*			*thing*
dis-in-com			*discompas*	*ings*			*things*
hyp-o-er			*hypocrite*	*tion cion*			
magn-i-a				*sian*			
multi			*magnify*	*cian*			*petition*
omni			*omniscienc*	*tian &c*			
int-er-ro				*tious &c*			*petitions*
enter			*entertain*	*siſs ces*			
post				*sys sus*			
preter			*postpone*	*tious*			*thesis*
recon				*cious &c*			
recom			*reconcile*	*leſs*			*harmleſs*
satis				*ment*			*indictment*
super			*satisfy*	*self*			
circum				*stract*			
trans			*transfer*	*stract*			*substract*
ext er in				*strict*			
extra			*extirpate*	*ward*			*forward*

THE LORDS PRAYER,



Cooper sculp.

Published [illegible], by R. Phillips, Bridge Street, Blackfriars, London

[illegible] man [illegible] from the [illegible] is scarce [illegible] [illegible] uses [illegible] [illegible].

[illegible] the history of [illegible] [illegible] the system [illegible] and [illegible]

[illegible], a genus of plants belonging [illegible] and [illegible] [illegible] natural system [illegible] order, personatae. [illegible]RAPHY, the art of [illegible] [illegible] The [illegible] being [illegible] by the [illegible] Dr. [illegible] as he himself [illegible] taken [illegible], "the father of [illegible]-hand," [illegible] the [illegible] of his [illegible]

Orthography in Short-hand.

[illegible] consonants in words are [illegible] and the orthography to [illegible] the pronunciation: [illegible] known to all, will render [illegible] by those who [illegible] not [illegible] in long hand. [illegible] [illegible] of consonants, not [illegible], can be easily known, they [illegible] without the least [illegible], or sometimes more [illegible] to promote greater ex[illegible] [illegible] for a single [illegible] similar sound; and no [illegible] to the meaning ensue. [illegible] consonant of the same [illegible] [illegible] come together, without any [illegible] them, only one is [illegible]: [illegible] vowel or vowels [illegible] [illegible] to be written: only [illegible] [illegible] perpendicular, horizontal [illegible] lines, they must only be [illegible] longer than [illegible], and [illegible] must have the [illegible] distinguished. See Plate. [illegible] written *mt*, [illegible] *ft*, [illegible] [illegible] [illegible] *lt*, [illegible] foreign, *fo* [illegible] [illegible] psalm, *sm*. [illegible] [illegible] In [illegible] short-hand [illegible] [illegible] the [illegible] sound [illegible] most compact [illegible]

[illegible]

[illegible] necessary to [illegible] [illegible] pronounced [illegible] [illegible] [illegible] to the [illegible] [illegible] this page. [illegible]

[illegible] only [illegible] [illegible] which [illegible] the [illegible] [illegible] with the [illegible] always to [illegible] vowel [illegible] [illegible] [illegible] [illegible] a [illegible] [illegible] [illegible] place [illegible] [illegible] [illegible] with [illegible]

For [illegible] [illegible] is [illegible] [illegible] [illegible] [illegible] [illegible] common [illegible] [illegible] to be placed [illegible] [illegible] point [illegible] and [illegible] point to the [illegible] [illegible] at the bottom.

[illegible] lines may be drawn [illegible] [illegible] ways [illegible] perpendicular, [illegible] with an inclined [illegible] [illegible] to the [illegible] [illegible] [illegible] [illegible] [illegible] distinction [illegible] to any other character, may [illegible] [illegible] These [illegible] [illegible] simplest [illegible] five consonants [illegible] most frequently [illegible] [illegible]

[illegible] may be divided [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible] consonants are [illegible] [illegible] [illegible] [illegible] [illegible] must have recourse to [illegible] [illegible] lines. The characters which we [illegible] adopted are the simplest in nature [illegible] those [illegible] approach nearest to the [illegible] joining, and tend to preserve [illegible] [illegible] [illegible] writing.

It must be observed that we [illegible] character [illegible] *c* when it has the [illegible] [illegible] or soft, as in *city*, [illegible] [illegible] the sound of *k* or [illegible] [illegible] will be sufficient to [illegible] place.

R [illegible] represented [illegible] [illegible] [illegible] only [illegible] [illegible] [illegible] [illegible] *l* [illegible] always [illegible] known [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

Z [illegible] employed [illegible] [illegible] [illegible] [illegible] [illegible], as [illegible]

We [illegible] only [illegible] rules [illegible] [illegible] [illegible] [illegible]

[illegible] [illegible] [illegible] place [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible] represent [illegible] the same [illegible] [illegible] it may be [illegible]

mination
mutandis
tys, tions,
be expres
for the co
ning, mid
4. *The* te
sion, cion,
a small cir
and turned
tions, sions,
the same al
5. *The* te
to be expre
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ings by a do
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words of mor
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is that piece
or capstans a
STEPHANI
nia order, in th
and in the nat
the 47th order
STERBEEKIA
and order poly
STERCULIA
ing to the class
of monogynia, a
ranking under
STEREOGRAP
the forms and fig
a plane.
STEREOMETR
try which teaches
bodies, that is, to
content of bodies,
cubes, vessels, shi
STEREOTYPE P
of stereotype print
page, for instance,
and when it is rend
a cast is taken

class of plants; the co- of all the flosculles is equal; the ole is monopetalous and funnel- d; the limb is campanulated and pa- ; there is no [illegible]; the seed is contained in the cup, is solitary, , and crowned with a long hairy

[illegible], a genus of the syngenesia mia æqualis class and order of

LE, *groom of the*, the eldest gentle- of his majesty's bedchamber, whose and honour it is to present and put majesty's first garment, or shirt, morning, and to order the things chamber.

MATUS, a genus of fishes of the podes, the generic character is, compressed; teeth in the jaws and ; body oval, broad, slippery, tail .

MOXYS, a genus of insects of the diptera: the generic character is, with a single-valved sheath, in- bristles, each in its proper sheath; two, short, setaceous, of five arti- ns; antennæ setaceous.

NES and EARTHS. The only sub- which enter into the composition imple stones, as far at least as ana- as discovered, are the six earths, alumina, zirconia, glucina, lime, agnesia; and the oxides of iron, nese, nickel, chromium, and cop- seldom more than four or five of ubstances are found combined to- in the same stone.

NEHENGE, in antiquity, a famed monument of huge stones on Sa- plain, six miles distant from that t consists of the remains of four of rough stones, ranged one within , some of them, especially in the ost and third rank, twenty feet nd seven broad; sustaining others ross their heads and fastened by s, so that the whole must have ly hung together. Antiquaries are etty well agreed that it was a Bri- ple.

NE WARE. Under the denomina- one ware are comprehended all ferent artificial combinations of bodies which are applied to useful es.

, in music, a word applied by vio- violoncello performers to that e of the strings by which they are into contact with the finger-board, which the pitch of the note is de- d.

, TRUMPET. A reed metallic called because its tone is imi- f the trumpet.

ES. If any person who has the or custody of any of the king's ar- ordnance, ammunition, shot, pow- habiliments of war, or of any vic- victualing the navy, shall, to his majesty's service, embezzle, pur- convey away the same to the va- [illegible] steal or embezzle [illegible] majesty's vessels, cartage, or any [illegible] naval stores [illegible] the value of [illegible] benefit of clergy [illegible]

STRANDED, among seamen, is said of a ship that is driven ashore by a tempest, or runs on ground through ill steerage, and so perishes.

STRATA, in natural history, the several beds or layers of different matters, whereof the body of the earth is composed.

STRATIOTES, *water-soldier*, a genus of plants belonging to the class of polyandria, and to the order of hexagynia; and in the natural system ranking under the first order, palmæ.

STRELITZIA, a genus of the class and order pentandria monogynia.

STREPTIUM, a genus of the didynamia angiospermia class and order.

STRIKE, a measure of capacity, containing four bushels.

STRIKE, among seamen, is a word variously used. When a ship, in a fight, or on meeting with a ship of war, lets down or lowers her top-sails, at least half-mast-high, they say she strikes, meaning she yields, or submits, or pays respect to the ship of war. Also, when a ship touches ground, in shoal-water, they say she strikes. And when a top-mast is to be taken down, the word of command is, strike the top mast, &c.

STRIX, the *owl*, in ornithology, a genus belonging to the order of accipitres. The bill is hooked, but has no cere or wax; the nostrils are covered with setaceous feathers; the head is very large, as are also the ears and eyes; and the tongue is bifid. There are 46 species.

STROMBUS, a genus of the vermes testacea. The generic character is, animal a limax; shell univalve, spiral; aperture much dilated; the lip expanding, and produced into a groove leaning to the left.

STRONGYLUS, a genus of vermes intestina. The generic character is, body round, long, pellucid, glabrous; the fore part is globular, truncate, with a circular aperture fringed at the margin; the hind part of the female entire and pointed; of the male dilated into loose, distant, and pellucid membranes.

STRONTIAN. About the year 1787, a mineral was brought to Edinburgh by a dealer in fossils, from the lead-mine of Strontian, in Argyleshire, where it is found imbedded in the ore, mixed with several other substances. It is sometimes transparent and colourless, but generally has a tinge of yellow or green. Its specific gravity varies from [illegible]. Its texture is generally fibrous; and sometimes it is found crystallized in slender prismatic columns of various lengths. Strontian is found also in different places of the world, and always combined with carbonic acid or sulphuric acid.

STRUMPFIA, a genus of plants belonging to the class of syngenesia, and to the order of monogamia.

STRUTHIO, the *ostrich*. The ostrich has a bill somewhat conical, the wings are so short as to be unfit for flying, the [illegible] and sides of the body are naked; the feet are formed for running, having two toes, one only of which is furnished with a nail. [illegible] the neck [illegible] a swan.

of them are said to be g
no feathers on the sides,
thighs, nor under the wi
part of the neck, about ha
ed with still smaller feat
of the belly and ba
also are of different colou
of each wing there is a
most like the quill of a
an inch long, being hollo
substance. There are
each wing; the largest o
extremity of the bone of
the other a foot lower.
to be more slender in p
of other birds, from its
ed with feathers. The
is of a livid flesh-colour,
properly would have l
bill is short and pointed
and a half at the beginn
nal form of the eye is lik
the upper eye-lid bein
eye-lashes which are lon
the lid below. The ton
short, and composed of
ments, and membranes,
fleshy fibres. In some t
long, and very thick a
others it is but half an in
forked at the end.

The ostrich is a nativ
rid regions of Africa, an
celebrated by those wh
sion to mention the anim

STRUTHIOLA, a ge
longing to the class of te
der of monogynia.

STRYCHNOS, a gen
longing to the class of
order of monogynia; a
system ranging under t
order, luridæ.

STUARTIA, a genus
ing to the class of m
order of polyandria;
[illegible]

lace, and entitling him to the ther.

DY, in law, signifies an aid or d to the king by parliament, cessary occasions of the king-

ANTIVE. See *Noun*.

NORMAL *of a curve*, in the higher , is the line which determines ction of the tangent with the , that determines the point the tangent cuts the axis pro-

NSE, in geometry, the same with of an arch.

ACTION. See *Arithmetic*.

ARIA, *rough-leaved alyssum*, or a genus of plants belonging to of tetradynamia, and order of ; and in the natural order under the 39th order, siliquosae.

NATS, salts formed with the acid, which see.

NIC ACID. Amber is a well-known, transparent, inflammable na-, pretty hard, and susceptible found at some depth in the d on the sea-coast of several s.

RANCE. Tenant at sufferance is olds over his term at first law-ted. A person is tenant at suf- who continues after the estate is d wrongfully holds against ano-

R, was formerly manufactured in ern parts of Europe, but at pre-ost all our sugar comes from the West Indies. The plant from is procured is the saccharum am. Other plants indeed contain it in such abundance. In North , however it is extracted from the marinum, or sugar maple. At- have been lately made to ex-om the beet.

in law, is used in the different as 1. Suit personal. 2. Suit of suit service, is an attendance ants owe to the court of their Suit covenant, is where the an- is covenanted with another, to s court. 4. Suit custom, when a his ancestors have been seized of mind, of his suit. 5. Suit real, when men come to the sheriff's eet. 6. Suit signifies the follow- in chase, as fresh suit. 7. It a petition made to the king or t person.

TYRO, a genus of quadrupeds der bruta; the generic character, each side near the eyes.

LATS, salts formed with the sul-id.

ITES, salts formed with the sul-acid.

UR, an inflammable fossil, of re are two species.

URETS are combinations of al-netals with sulphur.

URIC ACID is generally procured ning a mixture of sulphur and chambers lined with lead. Sul-id is a liquid somewhat of an oily re, transparent and colourless, ithout any smell, and of a very d taste. When applied to animal or vegetable substances, it very soon destroys their texture.

Sulphureous acid, may be procured by the following process. put into a glass retort two parts of sulphuric acid and one part of mercury, and apply the heat of a lamp; the mixture effervesces, and a gas issues from the beak of the retort and may be received in glass jars filled with mercury, and standing in a mercurial trough. This gas is sulphureous acid.

SUM, in mathematics, signifies the quantity that arises from the addition of two or more magnitudes, numbers, or quantities together.

SUN. See *Astronomy*.

SUPERCARGO, a person employed by merchants to go a voyage, and oversee their cargo or lading, and dispose of it to the best advantage.

SURD, in arithmetic and algebra, denotes any number or quantity that is incommensurable to unity, otherwise called an irrational number or quantity.

SURETY, in law, generally signifies the same with bail.

SURETY *of the peace*. A justice of the peace may, according to his discretion, bind all those to keep the peace, who in his presence shall make any affray, or shall threaten to kill or beat any person, or shall contend together with hot words; and all those who shall go about with unlawful weapons or attendance to the terror of the people; and all such persons as shall be known by him to be common barrators; and all who shall be brought before him by a constable for a breach of the peace in the presence of such constable: and all such persons who, having been before bound to keep the peace, shall be convicted of having forfeited their recognizance. *1 Hawk.* 77.

SURETY *of the good behaviour*, includes the peace, and he that is bound to the good behaviour, is therein also bound to the peace; and yet a man may be compelled to find sureties both for the good behaviour and the peace.

SURGERY, is the art of curing or alleviating diseases by local and external applications, manual or instrumental. As a science it may be defined, that department of medicine which treats of maladies thus susceptible of alleviation or cure.

SURIANA, a genus of the decandria pentagynia class of plants, the corolla of which consists of five petals, inversely ovated, patent, and of the length of the cup; there is no pericarpium except the crusts of the seeds, which are five in number, and roundish.

SUR-REBUTTER, a second rebutter.

SUR-REJOINDER. As a rejoinder is the defendant's answer to the replication of the plaintiff, so a sur-rejoinder is the plaintiff's answer to the defendant's rejoinder.

SURRENDER, a deed or instrument, testifying that the particular tenant of lands or tenements for life, or years, doth sufficiently consent and agree, that he who has the next or immediate remainder or reversion in the end, shall also have the present estate of the same in possession, and that he yields and gives up the same to him, for every surrender

T

ent's letter of our alpha-

ns, amongst the Roman for Titus. Titus, &c. tus; Tab. P. H. C. for ncis Hispaniæ citerioris; ; Ti. Tiberius; Ti. F. i. L. Titi Luci libertus; Ti. ns; T. J. A. V. P. V. D. arbitranve postulat ut terminum posuit; T. M. dedicavit; Tr. trans, I. or Mil. tribunus mi- L D E S. tribunus plebis t. A E R. tribunus ærarii; numviri capitales; T. R ribunicia potestata; Tul. lius.

genus of insects of the The generic character is, into a fleshy proboscis, wo lips; rostrum furnish- nted palpi, placed on each allel to the proboscis.

m merce, a kind of rich ndergone the operation of

the passing a silk or stuff der, the rolls of which are copper, variously engrav- sing unequally on the e surface unequally, so as ays of light differently, representation of waves

ONTANA, a genus of lass of pentandria, and ynia; and in the natural d under the 30th order,

rspective, denotes a plane ed to be transparent and o the horizon. It is always placed at a certain dis- the eye and the objects, o be represented thereon visual rays passing from ereof through the table to ce it is called perspective

ng the jewellers. A table- ner precious stone, whose urface is quite flat, and cut in angles; in which d cut tablewise, is used a rose-diamond.

mathematics, systems of ired to be ready at hand ing astronomical, geome- operations; thus we say, s; tables of sines, tan- ts, tables of logarithms, xagenary tables.

nus of the class and order ogynia.

PHY, the art of writing hand; of which authors several methods. See

hin, a great rope having te end, which is [illegible] [illegible] of the sail, so as reeved first through the [illegible] then is brought through [illegible] side.

TACK About, in the sea-language, is to turn the ship about, or bring her head about so as to lie the contrary way.

TACKLE, or TACKLES, a [illegible] denotes all the ropes, [illegible] used in managing the sails, &c.

TACTICS, in the art of war, is the method of disposing forces to the best advantage in order of battle, and of performing the several military motions and evolutions.

TÆNIA, the *Tape-worm*, in zoology, a genus of animals belonging to the class of vermes, and order of intestina. The body is long, depressed, and jointed like a chain, and contains a mouth and [illegible] in each joint. According to Gmelin, there are ninety-two species [illegible] inhabit the [illegible] of various [illegible], particularly of quadrupeds.

TAGETES, *French marigold*, a genus of plants of the class of syngenesia, and order of polygamia superflua, and in the natural system ranging under the [illegible] of compositæ. [illegible] the pappus consists of [illegible] beards; the calyx is [illegible] quinquedentate, and tubular, [illegible] four persistent florets of the ray.

TALC, a mineral [illegible] ters of which are, a specific gravity between 3.[illegible] and 2.[illegible]; a [illegible] easy to be scraped with the knife; a [illegible] and unctuous surface, the primitive form of a right rhomboidal prism, its bases having angles of [illegible] degrees and [illegible] degrees, and in which sections parallel with these bases are easily obtained [illegible] integrant molecule has the same form.

TALENT, a money of account among the ancients, equal to [illegible] sterling. Among the Jews, a talent of silver was equal to [illegible] manch, or 113 pounds, 10 ounces, 1 pennyweight, 10 and [illegible] grains.

TALES is used in law for a supply of men impanelled on a jury, and not appearing, or on their appearance challenged and disallowed, when the judge [illegible] orders a supply to be made by the sheriff of one or more such men, the present in court, to make up a jury.

[illegible]. See [illegible].

[illegible] among the Jews [illegible] their [illegible]

[illegible] genus of [illegible] generic character [illegible] in the upper jaw [illegible] the lower jaw eight; [illegible] on each side, the upper [illegible] seven in the upper [illegible]

[illegible]

SURROGATE, one who is substituted or appointed in the room of another; as the bishop or chancellor's surrogate.

SURSOLID, or *Surdesolid*, in arithmetic and algebra, the fifth power, or fourth multiplication of any number or quantity considered as a root.

SURSOLID *Problem*, in mathematics, is that which cannot be resolved but by curves of a higher nature than a conic section.

SURVEYING, the art of measuring land.

SUS, *hog*, a genus of quadrupeds, of the order belluæ. The generic character is, front teeth in the upper jaw four, converging, in the lower jaw six, projecting; canine teeth, or tusks, in the upper jaw two, rather short; in the lower jaw two, long, exserted; snout truncated, prominent, moveable; feet cloven.

SUSPENSION, or *Points of suspension*, in mechanics, are those points in the axis or beam of a balance, wherein the weights are applied, or from which they are suspended.

SWARTZIA, a genus of the class and order polyadelphia polyandria.

SWEARING, an offence punishable by several statutes; thus stat. 6 and 7 Will. III. cap. 11. ordains, that if any person shall profanely swear, if he is a labourer, servant, or common soldier, he shall forfeit 1s. to the poor, for the first offence, 2s. for the second, &c.; and any person not a servant, &c. forfeits 2s. for the first offence, 4s. for the second, 6s. for the third, &c. to be levied by distress of goods.

SWEDENBORGIANS, a sect of mystics, so called from the ingenious and learned, though eccentric, Emanuel *Swedenborg*, a Swedish nobleman.

SWEEP, in the sea-language, is that part of the mould of a ship, where she begins to compass in at the rung-heads; also, when the hawser is dragged along the bottom of the sea, to recover any thing that is sunk, they call this action sweeping for it.

SWERTIA, *march gentian*, a genus of plants belonging to the class of pentandria, and to the order of digynia; and in

T

the nineteenth letter of our alphabet.

...bbreviations, amongst the Roman... T. stands for Titus, Titius, &c. ...or Tabularius; Tab. P. H. C. for ...larius provinciæ Hispaniæ citerioris; ...Tarquinius; Ti. Tiberius; Ti. F. ...ii filius; Ti. L. Tiberii libertus; Ti. ...berius Nepos; T. J. A. V. P. V. D. ...ra judicem arbitramve postulat ut ...; T. M. P. terminum posuit; T. M. ... terminum dedicavit; Tr. trans, ...nus; Tr. M. or Mil. tribunus mi...; T. R. PL D E S. tribunus plebis ...natus; TR. A E R. tribunus ærarii; ...V. C A P. triumviri capitales; T. R. ...IB. POT. tribunicia potestate; Tul. ...llus Hostilius.

...BANUS, a genus of insects of the ...diptera. The generic character is, ...h formed into a fleshy proboscis, ...nated by two lips; rostrum furnish... ...th two pointed palps, placed on each ...of, and parallel to the proboscis.

...BBY, in commerce, a kind of rich ...which has undergone the operation of ...ing.

...BBYING, the passing a silk or stuff ...h a calender, the rolls of which are ...of iron or copper, variously engrav... which bearing unequally on the ...enders the surface unequal, so as ...ect the rays of light differently, ... the representation of waves ...

...ERNÆMONTANA, a genus of ...of the class of pentandria, and ...monogynia; and in the natural ...arranged under the 30th order, ...

..., in perspective, denotes a plane ...supposed to be transparent and ...cular to the horizon. It is always ... to be placed at a certain dis... ...ween the eye and the objects, ...ects to be represented thereon ...of the visual rays passing from ...nt thereof through the ... ...nce is called perspective ...

... among the jewellers. A ... ...r other precious stone, ...er surface is quite flat, ...ds cut in angles, in which ...ond cut tablewise, is used ... to a rose-diamond.

... mathematics, ...ulated to be ready ... ... astronomical ... ...er operations; ... ...tables; tables of ... ...tables of logarithms, ...secondary tables.

...s of the class and order ...gynia.

...PHY, the art of writing ...; of which ... ...several methods. ...

... [illegible] ...

...ch of the ... [illegible]

reached first through the ... ...tient is brought ... ...side.

TACK *About*, ...turn the ship about, or ... ...

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TALC, in mineralogy, a ... ...racters of which are, a speci... ...between 2.855 and 2.941; ...easy to be scraped with the knife ...and unctuous surface, the prim... ...of a right rhomboidal prism, ...having angles of 120 degrees an... ...grees, and in which sections pa... ...the bases are easily obtai... ...integrant molecule has the same ...

TALENT, a money of account ...the ancients, equal to ... ...amongst the Jews, a talent ... ...ce, ... ounces, ... pennyweights, ...grains.

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T... ..., see *Croton*.

... [illegible] ...

..., a genus of the ... ...The ge... ...the ... ...the lower ... ...on each side, ...ders several ...

... the famous ... ...by ... ...have ...

square redoubt cut in two. Loop-holes are made six feet from the ground, and three feet asunder, about eight inches long, two inches wide within, and six without. Behind is a scaffold two feet high, for the soldiers to stand upon.

It also signifies, both in French and English, a little box of timber-work covered with a cieling, withinside the porch of certain churches, both to prevent the view of persons passing by, and to keep off the wind, &c. by means of folding-doors.

TAMUS, *black briony*, a genus of plants of the class of diœcia, and order of hexandria, and in the natural system ranging under the 11th order, sarmentaceæ.

TAN, the bark of the oak, chopped and ground in a tanning-mill into a course powder, to be used in the tanning of leather.

TANACETUM, *tansy*, a genus of plants of the class of syngenesia, and order of polygamia superflua, and in the natural system ranging under the 49th order, compositæ.

TANÆCIUM, a genus of the angiospermia order, in the didynamia class of plants, and in the natural method ranking under the 25th order, putamineæ.

TANAGRA, *tanager*, in ornithology, a genus of birds belonging to the order of passeres. The beak is conical, acuminated, emarginated, almost triangular at the base, and inclining a little towards the point.

TANGENT, in geometry, is defined, in general, to be a right line which touches any arch of a curve, in such a manner that no right line can be drawn betwixt the right line and the arch.

TANNING is the art of converting the raw skins of animals into leather.

TANTALITE, a metallic fossil. Colour between bluish grey and blackish grey. Surface smooth, with some lustre. Lus-

TARTRATS, salts formed with the tartaric acid.

TAXUS, the *Yew tree*, a genus of plants of the class of diœcia, and order of monadelphia: and in the natural system ranging under the 51st order, coniferæ.

TEARS. That peculiar fluid which is employed in lubricating the eye, and which is emitted in considerable quantities when we express grief by weeping, is known by the name of tears.

TECTONA, a genus of the pentandria monogynia class and order. The corolla is five-cleft; stigma toothed; drupe, dry, spongy within the inflated calyx; nect. three-celled.

TELEGRAPH, an instrument by means of which information may be quickly conveyed to a considerable distance. The telegraph is by no means a modern invention, though it was not till the French revolution, that the telegraph was applied generally to useful purposes.

TELEPHIUM, *true orpine*; a genus of plants of the class of pentandria, and order of trigynia; and in the natural system ranking under the 54th order, miscellaneæ.

TELESCOPE. See *Optics*.

TELLER, an officer of the exchequer, in antient records called tallier; there are four of these officers, whose duty is to receive all sums due to the king, and to give the clerk of the pells a bill to charge him therewith.

TELLINA, a genus of vermes testacea; the generic character is, the animal a tethys; shell bivalve, generally sloping on one side; in the fore-part of one valve a convex, of the other a concave fold; hinge with usually three teeth, the lateral ones smooth in one shell.

TELLURIUM, a mineral found in Transylvania possessing the following properties:

Its colour is bluish-white, intermediate between that of zinc and lead; its texture is laminated like antimony; and its brilliancy is considerable. Its hardness has not been ascertained. Its specific gravity, according to Klaproth, is 6.1. It is very brittle, and may be easily reduced to powder. It melts when raised to a temperature somewhat higher than the fusing point of lead. If the heat is increased a little, it boils and evaporates, and attaches itself in brilliant drops to the upper part of the retort in which the experiment is made. It is therefore, next to mercury and arsenic, the most volatile of all the metals. When cooled slowly crystallizes.

TELIFEROUS, in entomology, means such insects as are armed with a dart or sting.

TEMPERAMENT, in music, the accommodation or adjustment of the imperfect sounds by transferring a part of their defects to the more perfect ones, in order to remedy, in some degree, the false intervals of those instruments, the sounds of which are fixed: as the organ, harpsichord, piano forte, &c.

TEMPERING *of steel and iron*, the rendering of them either more compact and hard, or soft and pliable, [illegible] different uses for which they are wanted may require.

TEMPLARS, or *Templers*, a religious order instituted at Jerusalem, about the year 1118. Some religious gentlemen put themselves under the government of the patriarch of Jerusalem, renounced property, made the vow of celibacy and obedience, and lived like canons regular. King Baldwin assigned them an apartment in his palace. They had likewise lands given them by the king, the patriarch, and the nobility, for their maintenance. They took the name of knights templars, because their first house stood near the temple dedicated to our Saviour, at Jerusalem. The order, after having performed many great exploits [illegible] the infidels, became rich and powerful all over Europe, but the knights, [illegible] their wealth and credit, fell into great disorders and irregularities. Many crimes and enormities being alleged against them, they were prosecuted in France, Italy, and Spain; and at last the pope, by his bull of the 22d of May, [illegible] given in the council of Vienne, pronounced the extinction of the order of Templars, and united their estates to the order of St. John of Jerusalem.

TENACITY, a term applied to metals, by which is meant the power that a metallic wire of a given diameter has of resisting, without breaking, the action of a weight suspended from its extremity.

TENAILLE. This word literally means shears. A military evolution which was performed in the times of the ancients.

TENANT, signifies one who holds or possesses lands or tenements by any kind of right, either in fee, for life, years, or at will.

TENDER, is an offer to pay a debt, or perform a duty.

If bank notes have been offered, and no objection made on that account, it has been considered by the court of king's bench as a good tender.

TENDER, a small ship in the service of men of war, for carrying of men, provisions, or any thing else that is necessary.

TENDONS, are white, firm, and tenacious parts, continuous to the muscles, and usually forming their extremities.

TENEBRIO, a genus of insects of the order of coleoptera. The generic character is, antennæ moniliform, with the last joint rounded; thorax plano-convex, margined; head exserted; wing-sheaths stiffish.

TENEMENT, in its original, proper, and legal sense, signifies every thing that may be holden, provided it be of a permanent nature, whether it be of a substantial, or of an unsubstantial and ideal kind.

TENNIS, a play at which a ball is driven by a racket.

TENON, in building, &c. the square end of a piece of wood or metal, diminished by one-third of its thickness, to be received into a hole in another piece, called a mortice, for joining or fastening the two together.

TENOR, of writs, records, &c. is the substance or purport of them, or a true [illegible] copy.

TENOR, in music, the second of the four parts in harmony [illegible] reckoning from the bass. The tenor [illegible]

[illegible] a [illegible] in the [illegible] &c. [illegible] and patterns [illegible]. Its length is at pleasure, and [illegible] exceeds that of the [illegible] piece. It consists of several long pieces of wood placed so [illegible] cross piece of wood may be raised or lowered, as is found requisite, to be fixed at any height by means of pins. Along the pieces, both the upper and under one, are hooked nails, called tenter-hooks, [illegible] in space to space.

[illegible] a genus of insects of the [illegible], in place of the generic characters [illegible], mouth with jaws, without proboscis; wings flat, swelled; sting [illegible] consisting of two serrated [illegible] projecting laminæ; scutellum with two distinct granules.

TENTHS, that yearly portion or tribute [illegible] ecclesiastical livings anciently [illegible] king.

[illegible] the manner whereby lands [illegible] holden, or the service [illegible] lord.

[illegible] very small [illegible] within the [illegible] alternate, five, [illegible] headed.

[illegible] a genus of vermes mol[illegible] body ob[illegible] naked, often enclosed in [illegible] with lateral tufts and [illegible] placed before, furnished [illegible] teeth, and [illegible] feelers numerous, [illegible] seated round the mouth. [illegible] animal [illegible] a genus of [illegible]

TEST, a vessel used in metallurgy for
sorbing the scoriæ of metallic bodies
ten melted.

TEST-ACT. A statute 25 Car. II. cap. 2.
hich requires all officers, both civil and
litary, to take the oaths and test, viz.
sacrament, according to the rites and
remonies of the church of England. Va-
us ineffectual attempts have been
ade by the Dissenters, to obtain the re-
al of this act, which is evidently of-
sive to the genuine principles of civil
d religious liberty.

TESTACEA, in the Linnæan system of
tural history, the third order of vermes.
is order comprehends all shell-fish, ar-
nged by Linnæus under thirty-six ge-
ra. Shell-fish are animals with a short
dy, covered by or inclosed in a firm
rd and stony habitation, composed, ac-
rding to their three separate orders.

TESTAMENT, in law, a solemn and
thentic act, whereby a person declares
will, as to the disposal of his estate,
ects, burial, &c.

TESTUDO, tortoise, a genus of amphi-
, of the order of reptiles. The generic
aracter is, body defended by a bone,
vering coated by a horny, scaly, or co-
iceous integument; mouth without dis-
ct or proper teeth, the upper mandible
ing over the lower.

TESTUDO, in the military art of the an-
nts, was a kind of cover or screen
hich the soldiers, *e. gr.* a whole company
ade themselves of their bucklers, by
lding them up over their heads, and
nding close to each other. This expe-
ent served to shelter them from darts,
nes, &c. thrown upon them, espe-
lly those thrown from above, when
ey went to the assault.

TESTUDO was also a kind of large
oden tower which moved on several
heels, and was covered with bullocks'
des, serving to shelter the soldiers when
ey approached the walls to mine them
to batter them with rams.

TETHYS, a genus of insects belonging
the class of vermes, and order of mol-
sca. The body is oblong, fleshy, and
thout feet; the mouth consists of a cylin-
ical proboscis under the duplicature of
ip; and there are two foramina at the
t side of the neck.

TETRACERA, a genus of plants of the
s polyandria, and order tetragynia, and
the natural system ranging under the
ubtful.

TETRACHORD, in music, a concord in
music of the antients consisting of
ee degrees, or intervals, and four terms,
sounds; called by the Greeks also
tessaron, and by us a fourth.

TETRADIAPASON, the Greek appella-
n of the quadruple octave, which we
o call the 29th.

TETRADYNAMIA, the name of the
h class in Linnæus's sexual system.

TETRAEDRON, or *Tetrahedron*, in geo-
try, is one of the five Platonic or regu-
bodies or solids, comprehended under
r equilateral and equal triangles. Or
s a triangular pyramid of four equal
d equilateral faces.

TETRAGONIA, a genus of plants of the
s of icosandria, and order monogynia; and in the natural system ranging under the 13th order, succulentæ.

TETRAGYNIA, the name of an order, or secondary division, in the 4th, 5th, 6th, 8th, and 13th classes in the sexual system.

TETRALOMA, a genus of insects of the coleoptera order. The generic character is, antennæ clavate, the club perfoliate, less rounded, entire; feelers thickish, unequal; shells as long as the abdomen.

TETRANDRIA, the name of the fourth class in Linnæus's sexual system.

TETRANTHUS, a genus of the syngenesia polygamia segregata class and order of plants.

TETRAO, in ornithology, a genus of birds belonging to the order of gallinæ, and thus characterised by Linnæus: there is a spot near the eyes naked or papillose, or covered, though more rarely, with feathers.

TETRODON, a genus of fishes of the order nantes. The generic character is, jaws bony, divided at the tip; body roughened beneath; ventral fins wanting.

TEUCRIUM, *germander*, a genus of plants of the class didynamia, and order gymnospermia; and in the natural system ranging under the 42d order, verticillatæ.

TEUTHIS, a genus of fishes of the abdominal order. The generic character is, head truncate on the fore part; gill-membrane five-rayed; teeth equal, rigid, approximate in a single row.

TEUTONIC ORDER, a military order of knights, established towards the close of the twelfth century, and thus called as consisting chiefly of Germans or Teutons. The origin, &c. of the Teutonic order is said to be this: The Christians, under Guy of Lusignan, laying siege to Acre, a city of Syria, on the borders of the Holy Land, some Germans of Bremen and Lubec, touched with compassion for the sick and wounded of the army, who wanted common necessaries, set on foot a kind of hospital under a tent, which they made of a ship's sail, and here betook themselves to a charitable attendance on them. This excited a thought of establishing a third military order, in imitation of the templars and hospitalers. The design was approved of by the patriarch of Jerusalem, the archbishops and bishops of the neighbouring places, the king of Jerusalem, the masters of the temple and hospital, and the German lords and prelates then in the Holy Land, and pope Calixtus III. confirmed it by his bull, and the new order was called the order of Teutonic knights of the house of St. Mary at Jerusalem. The pope granted them all the privileges of the templars and hospitalers of St. John, excepting that they were to be subject to the patriarchs and other prelates, and that they should pay tythe of what they possessed.

THALIA, a genus of plants of the class monandria, and order monogynia; and in the natural system ranging under the eighth order, scitamineæ.

THALICTRUM, *meadow rue*, a genus of plants of the class polyandria, and order polygynia; and in the natural system sided incomplete pyramids; sometimes it occurs in regular six-sided prisms. The crystals are often very slender. Its texture appears fibrous. Lustre 2. Glassy. Causes single refraction. Brittle. Specific gravity 3.45 to 3.46. Colour dark green. Powder white or yellowish green, and feels dry. It does not become electric, by heat. Before the blowpipe, froths, and melts into a black slag. With borax melts into a green bead.

THASPIA, the deadly carrot, a genus of plants of the class pentandria, and order digynia.

THEA, the tea-tree, in botany, a genus of the class and order polyandria monogynia. The corolla is six or nine-petalled; the calyx five or six-leaved; the capsule tricoccous. There are two species, or at least principal varieties; the viridis or green, and the bohea, which again admit of various subdivisions or varieties. There is, however, much uncertainty on this point. The country of which the tea plant is a native is hidden from the exploring eye of the philosopher; it is jealous of Europeans, and seldom gives them an opportunity of studying its productions.

THEATINES, a religious order in the Romish church, so called from their principal founder John Peter Caraffa, then bishop of Theate, or Chieti, in the kingdom of Naples, and afterwards pope, under the name of Paul IV.

THEFT, in law, an unlawful felonious taking away another man's moveable and personal goods, against the owner's will, with intent to steal them. It is divided into theft or larceny, properly so called, and petit theft, or petit larceny; the former whereof is of goods above the value of 12*d.* and is deemed felony; the other, which is of goods under that value, is not felony.

THEFTBOTE, the receiving a man's goods again from a thief, or other amends

purpose of
the corresp
quid, is call
sure of the
THESIU
plants of th
monogynia.
THLASP
mustard, a g
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obcordate, a
are boat-sha
rinated. T
six only are
THOA, a g
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THRASHI
ture, the art
the ears.
THRAVE,
four sheaves,
to the shock, t
only reckon t
THREAD,
number of fin
animal substa
silk; from w
nen, cotton, or
THREATEN

on the back, slightly crossed. There ght species.

RYALLIS, a genus of plants of the decandria, and order monogynia; the natural system ranging under h order, tricoccæ.

JA, the *arbor vitæ*, a genus of plants class monadelphia, and order mo- ; and in the natural system ranging the 51st order, coniferæ. There are ecies.

UMMERSTONE. This stone was scribed by Mr. Schreber, who found r Balme D'auris in Dauphine, and the name of shorl viole. It was ards found near Thum in Saxony, sequence of which Werner called mmerstone. It is sometimes amor- but more commonly chrystallized. imitive form of its chrystals is a gular prism, whose bases are paral- ms with angles of 101 deg. 32 and 28. The most usual variety is a omboidal parallelopiped, with two pposite edges wanting, and a small place of each. The faces of the lopiped are generally streaked lon- ally.

NDER, the noise occasioned by the ion of a flash of lightning passing the air.

NBERGIA, a genus of plants be- to the class and order didynamia ermia. There are 2 species.

MBRA, a genus of the class and idynamia angiospermia.

MUS, *Thyme*, a genus of plants of s didynamia, and order gymnos- ; and in the natural system ranging the 42d order, verticillatæ. The ca- ilabiate, and its throat closed with rs. There are 22 species.

MUS, in anatomy, a gland, which in is very remarkable; it is situated pper part of the thorax, immedi- nder the sternum, and lies upon icardium, and on the trunk of the nd of the vena cava.

NNUS, a genus of the hymenopte- r of insects. The generic charac- mouth horny, with an incurved le; the jaw short and straight; lip than the jaw, membranaceous at , and trifid, the middle division nate; tongue very short, involute; four, equal, filiform; antennæ cy- al, the first joint thicker.

RSUS, in botany, a mode of flower- embling the cone of a pine.

RELLA, a genus of plants of the candria, and order digynia, and in ural system ranging under the 13th succulentæ.

S. See *Astronomy*.

-WAITERS, or *tidesmen*, are infe- cers belonging to the custom-house, employment it is to watch or at- pon ships, until the customs are

CE, or *Teirce*, a measure of liquid as wine, oil, &c. containing the art of a pipe, or forty-two gal-

R-SHELL, a beautiful species of of a dusky-red colour, spotted all with large irregular blotches of

, in building, a sort of thin brick, used on the roofs of houses; or more properly a kind of clayey earth, kneaded and moulded of a just thickness, dried and burnt in a kiln, like a brick, and used in the covering and paving of different kinds of military and other buildings.

TILIA, *lime*, or *linden-tree*, a genus of plants of the class polyandria, and order monogynia, and in the natural system ranging under the columniferæ.

TILLANDSIA, a genus of the hexandria monogynia class of plants with a tubulated monopetalous flower, trifid at the limb; the fruit is a long, obtusely trigonal, and acuminated capsule, formed of three valves, and containing only one cell, with numerous seeds affixed to a long capillary plume. There are 16 species.

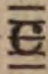
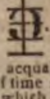
TILLER *of a ship*, a strong piece of wood fastened in the head of the rudder, and in small ships and boats called the helm.

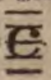
TILLŒA, a genus of plants of the class tetrandria, and the order tetragynia, and in the natural system ranging under the 13th order, succulentæ.

TILT-BOAT, a boat covered with a tilt, that is, a cloth or tarpaulin, sustained by hoops, for the sheltering of passengers.

TIMBER, includes all kinds of felled and seasoned woods.

TIME, in music, is an affection of sound by which we denominate it long or short, with regard to its continuance.

Common or double time is of two species. 1. When every bar or measure is equal to a semibreve, or its value in any combination of notes of a lesser quantity. 2. When every bar is equal to a minim, or its value in lesser notes. The movements of this kind of measure are various; but there are three common distinctions, the first slow, signified by the mark C; the second brisk, signified by ; the third very quick, signified by .

The old musicians were acquainted with no more than two sorts of time: one of three measures in a bar, which they called perfect; and the other of two, considered as imperfect. When the time was perfect, the breve was equal to three semibreves, which was expressed by an entire circle, barred or not barred, and sometimes also by this compound character $\frac{3}{1}$. When the time was imperfect, the breve was equal only two semibreves, which was indicated by a semicircle, or C. Sometimes the C was reversed as thus Ɔ, which signified a diminution, by one half, of the powers of the notes; a particularity sometimes denoted in the more modern music by a perpendicular bar drawn through the character, as thus . The time of the full C [illegible] undergoes no farther change. Neither it sensibly altered by being kept und cold water; but when the stream of w ter is made to pass over red-hot tin, it decomposed, the tin is oxidated, and h drogen gas is evolved.

TIN-stone, an ore of tin which occurs masses, in rounded pieces and crystalli ed. These crystals are very irregul Colour dark-brown; sometimes yellowi grey, and sometimes nearly white. Som what transparent when crystallized. Sp cific gravity 6.9 to 6.97. Before the blo pipe it decrepitates, and on charcoal partly reduced. Tinges borax white.

TINCTURE, in heraldry, the hue or c lour of any thing in coat-armour.

TINNING. Tinning is the art of c vering any metal with a thin coating tin. Copper and iron are the met most commonly tinned. What are co monly called tin-plates, or sheets, much used for utensils of various kin are in fact iron plates coated with tin.

The principal circumstance in the art tinning is, to have the surfaces of the n tal to be tinned perfectly clean and f from rust, and also that the melted may be perfectly metallic, and not vered with any ashes or calx of tin.

Tinning of iron. When iron plates ar be tinned, they are first scoured, then put into what is called a pic which is sulphuric acid diluted v water; this dissolves the rust or ide that was left after scouring, renders the surface perfectly cle They are then again washed and scou They are now dipped into a vessel fu melted tin, the surface of which is cov ed with fat or oil, to defend it from action of the air. By this means, the i coming into contact with the melted ti a perfectly metallic state, it comes

f plants of the class decandria, and
monogynia. The calyx is five-tooth-
l-shaped; petals five, obcordate;
se. There is only one species, the
am.
balsam possesses the same general
with the balsam of Gilead, and that
.* It is, however, less heating and
ting, and may, therefore, be em-
with more safety. It has been
sed as a pectoral, and is said to be
acious corroborant in gleets and se-
weaknesses. It is directed by the
copœias in the syrupus tolutanus,
tolutana, and syrupus balsami-

BAC, a metal composed of copper
enic.
ERS, a genus of the class and order
odria monogynia. The involute is
five-leaved; calyx none; corolla
alled; nect. scales five; berry one
There are three species, of which
pere or tallow-tree of China is the
markable.
weight, 20 hundred.
E, or *Tune*, in music, a property of
whereby it comes under the relation
and acute; or it is the degree of
n any sound has, from the degree
ness of the vibrations of the parts
ous bodies.
NAGE, a custom or impost due for
ndize brought or carried in tons
to other nations after a certain
every ton.
SELLA, a genus of the class and
iandria monogynia. The calyx is
rted; petals five; nect. pitcher-
; berry one-celled, four-seeded.
SURE, in ecclesiastical history, a
lar manner of shaving or clipping
of ecclesiastics or monks.
TINE, a species of increasing an-
a which money is sometimes bor-
either for the service of the state, or
ting bridges, churches, theatres, ta-
and other expensive buildings. It
lly divided into a certain number
s, for each of which a life is nomi-
and a certain annual sum being
rt for payment of interest on the
advanced, the same sum is to con-
o be annually divided among the
ng nominees, by which means their
es increase as the number of shares
uces, till the whole are extinct.
Z. The name topaz has been re-
by Mr. Hauy to the stones called
eralogists occidental ruby, topaz,
pphire; which, agreeing in their
lization and most of their proper-
re arranged under one species by
me de Lisle.
opaz is found in Saxony, Bohemia,
and Brazil, mixed with other mi-
n granite rocks.
ommonly chrystallized. The pri-
form of its chrystals is a prism
sides are rectangles, and bases
, having their greatest angles 124
min. and the internal molecule has
me form; and the height of the
to a side of the rhomboidal bases
. The different varieties of topaz
s hitherto observed, amount to 6.
these are eight-sided prisms, ter-
l *by four-sided pyramids, or*

wedge-shaped summits, or by irregular figures of 7, 13, or 15 sides: the last variety is a twelve-sided prism, terminated by six-sided pyramids wanting the apex.

The texture of the topaz is foliated. It causes a double refraction. Specific gravity from 3. 46 to 3. 56. The Siberian and Brazil topazes, when heated, become positively electrified on one side, and negatively on the other. It is infusible by the blowpipe. The yellow topaz of Brazil becomes red when exposed to a strong heat in a crucible; that of Saxony becomes white by the same process. This shews us that the colouring matter of these two stones is different.

TOPOGRAPHY, a description or draught of some particular place, or small tract of land, as that of a city or town, manor or tenement, field, garden, house, castle, &c. such as surveyors set out in their plots, or make draughts of, for the information and satisfaction of the proprietors.

TORDYLIUM, *hart-wort*, in botany a genus of plants of the class pentandria, and order digynia, and in the natural system arranged under the 45th order, umbellatæ.

TORMENTILLA, *Tormentil*, a genus of plants of the class icosandria, and order polygynia, and in the natural system ranging under the 35th order, senticosæ. The calyx is octofid; the petals are four; the seeds round, naked, and affixed to a juiceless receptacle. There are two species.

TORNADO, or *Tornado*, a sudden and vehement gust of wind from all points of the compass frequent on the coast of Guinea.

A tornado seems to partake much of the nature of a whirlwind or perhaps of a water-spout, but is more violent in its effects. It commences very suddenly, several clouds being previously drawn together, when a spout of wind, proceeding from them, strikes the ground, in a round spot of a few rods or perches diameter, in the course of the wind of the day, and proceeds thus half a mile or a mile. The proneness of its descent makes it rebound from the earth, throwing such things as are moveable before it, but some sideways or in a lateral direction from it. A vapour, mist, or rain descends with it, by which the path of it is marked with wet.

TORRID *zone*, among geographers, denotes that tract of the earth lying upon the equator, and on each side as far as the two tropics, or 23 deg. 30 min. of north and south latitude.

TORTOISE-*shell*, the shell of the testaceous animal called a tortoise; used in inlaying, and in various other works, as for snuff-boxes, combs, &c.

TOUCAN, in astronomy, a constellation of the southern hemisphere, consisting of eight small stars, and otherwise called anser americanus.

TOUCH-*needle*, among assayers, refiners, &c. little bars of gold, silver, and copper, combined together in all the different proportions and degrees of mixture; the use of which is to discover the degree of purity of any piece of gold or silver by comparing the mark it leaves on the touchstone with those of the bars.

in form of an oval tube, longer than the calyx, divided into five slight segments somewhat broad and pointed, and spread open; the fruit is a globose berry, containing two cells, and the seeds are of an oval figure, two in number, and separated by the pulp.

TOURRETTIA, a genus of the didynamia angiospermia class and order. The cal. is two-lipped; cor. lower lip none; caps. echinate, four-celled, two-valved. There is one species.

TOWER, any high building raised above another, consisting of several stories, usually of a round form, though sometimes square or polygonal; a fortress, a citadel. Towers are built for fortresses, prisons, &c. as the tower of the Bastile, which was destroyed by the inhabitants of Paris in 1789.

TOXICODENDRON, the *poison-weed*.

TOZZIA, a genus of the didynamia angiospermia class of plants, with a monopetalous ringent flower; the upper lip of which is bifid, and the lower one trifid; the fruit is a globose unilocular capsule, containing an ovate seed. One species.

TRACHELIUM, a genus of the pentandria monogynia class of plants, with a funnel-fashioned flower, divided into five segments at the limb; the fruit is a roundish obtusely trilobous capsule, containing a great number of very minute seeds. There are three species.

TRACHICHTHYS, a genus of fishes of the order thoracici. The generic character, is, head rounded in front; eyes large; mouth wide, toothless, descending; gill-membrane with eight rays, the four lowermost of which are rough on the edges; scales rough; abdomen cataphracted with large carinate scales. There is only a single species.

TRACHINUS, *Weever*, a genus of fishes of the order jugulares; the generic cha-

ted, plane,
its fruit is a
taining a fe
19 species.

TRAGAC
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TRAGED

TRAGIA,
andria clas
er-petals; i
cous capsu

RAMMELS, in mechanics, an instru-
t used by artificers for drawing ovals
n boards, &c. One part of it consists
cross with two grooves at right angles;
other is a beam carrying two pins
ch slide in those grooves, and also the
ribing pencil.

RAMMEL-NET, is a long net, where-
to take fowl by night in champain
ntries, much like the net used for the
-bell, both in shape, bigness, and
hes. To use it, they spread it on the
nd, so that the nether or further end,
d with small plummets, may lie loose
eon; then the other part being borne
by men placed at the fore ends, it is
trailed along the ground. At each
are carried great blazing lights, by
ch the birds are raised, and as they rise
er the net they are taken.

RANSCENDENTAL, or *Transcendant*,
ething elevated or raised above other
gs, which passes and transcends the
re of other inferior things. Transcen-
tal quantities, among geometricians,
indeterminate ones, or such as can-
be fixed, or expressed by any con-
t equation; such are all transcen-
tal curves which cannot be defined by
algebraic equation, or which when ex-
sed by an equation, one of the terms
eof is a variable quantity.

RANSIT, in astronomy, signifies the
sage of any planet just by or over a fix-
tar, or the sun; and of the moon in
icular covering or moving over any
net.

RANSITION, in music, the softening
sjunct interval by the introduction of
rmediate sounds. In harmony, tran-
n is the changing the genus or mode
sensible but regular manner.

RANSMUTATION, in geometry, de-
es the reduction or change of one
re or body into another of the same
or solidity, but of a different form;
triangle into a square, a pyramid
a parallelopiped, &c. In the higher
metry, transmutation is used for the
verting a figure into another of the
e kind and order, whose respective
ensions in an equation, admit of the
e tangents, &c.

RANSOM, among builders, denotes
piece that is framed across a double-
l-window.

RANSOM, among mathematicians,
ifies the vane of a cross-staff, or a
oden number fixed across, with a
are, whereon it slides, &c.

RANSOM, in a ship, a piece of tim-
which lies athwart the stern, between
two fashion pieces, directly under the
-room port.

RANSPORTATION, the act of con-
ing or carrying a thing from one place
nother.

ransportation is a kind of punishment,
nore properly an alleviation or com-
ation of punishment; for criminals
victed of felony; who for the first of-
ce, unless it is an extraordinary one,
generally transported to the planta-
ns, (at present to New South Wales),
re to bear hard labour for a term of
rs, within which if they return, they
executed without further *trial* than
ntifying their persons.

TRANSPOSITION, in algebra, the bringing any term of an equation over to the other side.

TRANSUBSTANTIATION, in theology, the conversion or change of the substance of the bread and wine in the eucharist, into the body and blood of Jesus Christ, which the Romish church holds is wrought by the consecration of the priest. This is a main point in the Romish religion, and is rejected by the protestants, the former maintaining the transubstantiation to be real, the latter only figurative; interpreting the text hoc est corpus meum, "this signifies my body;" but the council of Trent stood up strenuously for the literal sense of the verb *est*, and say expressly, that in transubstantiation the body and blood of our Lord Jesus Christ are truly, really, and substantially, under the species of bread and wine.

TRANSVERSE MUSCLES, in anatomy, are certain muscles arising from the transverse processes of the vertebræ of the loins.

TRAPA, a genus of the tetrandria monogynia class of plants, the corolla whereof consists of four petals, vertically ovated and larger than the cup; the fruit is a hard osseous capsule, of an oblong oval figure, containing only one cell, and armed with four sharp thick spines, placed oppositely in the middle of the sides, and pointed; these before were the leaves of the calyx: the seed is a covered single nucleus, of an oval figure. There are two species, aquatics.

TRAPEZIUM, in geometry, a plane figure contained under four unequal right lines.

TRAVERSE, or **TRANSVERSE**, in general, denotes something that goes athwart another; that is, crosses and cuts it obliquely.

TRAVERSE, in law, signifies sometimes to deny, sometimes to overthrow or undo a thing, or to put one to prove some matter; much used in answer to bills in chancery: or it is that which the defendant pleads or says in bar to avoid the plaintiff's bill, either by confessing and avoiding, or by denying and traversing the material part thereof.

TRAVERSE AN INDICTMENT, is to take issue upon the chief matter, and to contradict or deny some point of it. A traverse must be always made to the substantial part of the title. Where an act may indifferently be intended to be at one day or another, there the day is not traversable.

TRAVESTY, or **TRAVESTI**, a French term, derived from the verb travestir, to disguise one's self, or to appear in masquerade: and hence, travesty is applied to the disfiguring of an author, or the translating him into a style and manner different from his own, by which means it becomes difficult to know him.

TREASON, in law, is divided into high treason and petty treason. High treason is defined to be an offence committed against the security of the King or kingdom, whether it be by imagination, word, or deed; as to compass or imagine the death of the King, Queen, or Prince, or to deflower the King's wife, or his eldest daughter unmarried; or his eldest son's wife; or levy war against the King in his realm, adhere to his enemies, counterfeit his great seal, privy seal, or money, or wittingly to bring false money into this realm, counterfeited like the money of England, and utter the same, to kill the King's Chancellor, Treasurer, Justices of either bench, Justices in Eyre, of Assize, or of Oyer and Terminer, being in their place doing his office, forging the King's sign manual or privy signet, privy seal, or foreign coin current here, or diminishing or impairing current money. In this case of treason, a man shall be drawn, hanged, and quartered, and forfeit his lands and goods to the king. 25 *Ed*. III.

TREASON, *petit*. Whenever a wife murders her husband, a servant his master, or mistress, or an ecclesiastic a prelate, or to whom he owes obedience, every one of these offences is petit treason.

As every petit treason implies a murder it follows, that the mere killing of an husband, master, or prelate, is not always petit treason; for if there are not such circumstances in the case of killing one of these persons, as would have made it murder in the case of killing any other person, it does not amount to this offence.

There can be no accessary in high treason. And it seems to be always agreed that what would have made a man an accessary before the fact in any other felony, makes him a principal in high treason.

TREASURE TROVE, is where any money or coin, gold, silver, plate, or bullion, is hidden in the earth, or other private place, the owner being unknown: in which case, the treasure belongs to the king, or some other who claims by the king's grant or by prescription. But if he that hid it is known, or afterwards found out, the owner, and not the king, is entitled to it. If it is found in the sea, or upon the earth, it does not belong to the king, but to the finder, if no owner appear.

TREASURER, an officer to whom the treasure of a prince, or corporation, is committed to be kept, and duly disposed of.

TREMELLA, a genus of plants of the class of cryptogamia, and natural order of algæ. It is of a gelatinous membranous substance; the parts of the fructification scarcely visible. There are eleven species.

TREMOLITE, in mineralogy, is a species of the talc genus, of which there are three sub-species, viz. the asbestos; the common, and the glassy; the colours of the last are yellowish, reddish, grey, and green; it occurs massive and crystallized, it is easily frangible, and not very heavy, its constituent parts are Silica, 65.00; Magnesia, 10.33; Lime, 18.00; Oxide of iron, 0.16; Water and carbonic acid, 6.50.

TRENCHES, in fortification, are ditches cut by the besiegers, that they may approach more securely to the place attacked; whence they are also called lines of approach. The tail of the trench is the place where it was begun, and its head is the place where it ends. The trenches are usually begun or opened, in the night-time; sometimes within musket shot, and sometimes within half or whole cannon shot of the place. They are carried on in winding lines, nearly parallel to the works of the fortress, so as not to be in the view of the enemy, nor exposed to the enemy's shot. The workmen employed in the trenches are always supported by a number of troops, to defend them against the sallies of the besieged; the pioneers sometimes work on their knees, and are usually covered with mantlets or faucissons; and the men who support them, lie flat on their faces, in order to avoid the enemy's shot.

TRESPASS, is any transgression of the law, under treason, felony, or misprision of either.

TRET, in commerce, an allowance made for the waste or the dirt, that may be mixed with any commodity, which is always four pounds in every hundred and four pounds weight.

TREWIA, a genus of the polyandria monogynia class of plants, having no corolla besides the cup; the fruit is a turbinated, triquetrous, coronated, trilocular, trivalvar, capsule: the seed is single, convex on one side, and angular on the other. There is one species.

TRIAL, the proceeding of a court of law, when the parties are at issue, such as the examination of witnesses, &c. to enable the court deliberately weighing the evidence given on both sides, to draw a true conclusion, and administer justice accordingly.

TRIANDRIA, in the Linnæan system of botany, a class of plants, the third in order; comprehending all such plants as have hermaphrodite flowers, with three stamina, or male parts, in each; whence the name.

TRIANGLE, in geometry, a figure bounded or contained by three lines or sides, and which consequently has three angles, from whence the figure takes its name.

TRIANGULAR COMPASSES, are such as have three legs, or feet, whereby to take off any triangle at once, much used in the construction of maps, globes, &c.

TRIANGULAR NUMBERS, are a kind of polygonal numbers being the sums of arithmetical progressions which have 1 for the common difference of their terms. Thus, from these arithmeticals 1 2 3 4 5 6, are formed the triang. numb. 1 3 6 10 15 21, or the third column of the arithmetical triangle above mentioned.

The sum of any number n of the terms, of the triang. numb. 1, 3, 6, 10, &c. is =

$$\frac{n^3}{6} + \frac{n^2}{2} + \frac{n}{3}, \text{ or } \frac{n}{1} \times \frac{n+1}{2} \times \frac{n+2}{3}$$

which is also equal to the number of shot in a triangular pile of balls, the number of rows, or the number in each side of the base, being n.

The sum of the reciprocals of the triangular series, infinitely continued, is equal to 2; viz.

$$1 + \tfrac{1}{3} \times \frac{1}{6} \times \frac{1}{10} + \frac{1}{15} \text{ \&c.} = 2.$$

TRIANGULAR CANON, the tables of artificial sines, tangents, secants, &c.

TRIANGULAR QUADRANT, is a sector furnished with a loose piece, whereby to make it an equilateral triangle.

he calendar is graduated thereon,
the sun's place, declination, and other
al lines; and by the help of a string
a plummet, and the divisions gradu-
on the loose piece, it may be made
erve for a quadrant.

RIANTHEMA, a genus of the class
order decandria digynia. The calyx
ocronate below the tip; no corolla;
nna 5 or 10; germ. retuse, capsule
ouod. Seven species.

RIBULUS, *caltrops*, a genus of the de-
ria monogynia class of plants, the
lla of which consists of five oblong,
ise, and patent petals; its fruit is of a
adish figure and aculeated, being con-
ed of five capsules, gibbous on one
, and armed with three or four points
he other, angulated and convergent;
containing numerous seeds, turbi-
ed and oblong. Four species.

RICERA, a genus of the class and or-
monoecia tetrandria. There is no co-
a; the male is four-leaved; filaments
, ovate, female calyx five-leaved;
es conical; capsules three, horned,
e-celled. One species.

RICHECHUS, *walrus*, a genus of qua-
peds of the order bruta. The gene-
character is, fore-teeth (in the full-
wn animal) none either above or be-
; tusks solitary, in the upper jaw;
ders with wrinkled surfaces; lips
bled; hind feet at the extremity of the
y, uniting into a fin.

RICHIURUS, a genus of fishes of the
er apodes; the generic character is,
d stretched forwards, with lateral gill-
ers; teeth ensiform, semisagittate at
tips; gill-membrane seven-rayed;
ly ensiform, compressed, with subu-
finless tail.

RICHODA, a genus of vermes infuso-
; the generic character is, a worm in-
ble, pellucid, hairy or horned.

RICOCEPHALUS, a genus of vermes
estina. The generic character is, body
nd, elastic, and variously twisted;
d or fore part much thicker, and fur-
hed with a slender exsertile proboscis;
or lower part long, capillary, and
ering to a fine point. Six species.

RICHILIA, a genus of the class and or-
decandria monogynia. The calyx is
stly five-toothed; petals five; necta-
m toothed; capsules three-celled, three
ved; seeds berried. Twelve species.

RICHOCARPUS, a genus of the class
d order polyandria digynia. The calyx
our or five parted; no corolla; styles
, bifid; capsules bristly, four-valved,
ny-seeded. One species.

RICHOMANES, a genus of plants of
class cryptogamia, and order filices.
e parts of fructification are solitary;
d terminated by a stile like a bristle, on
ery edge of the leaf. 27 species.

RICOCCÆ, the name of the 38th or-
in Linnæus's Fragments of a Natural
thod, consisting of plants with a sin-
three-cornered capsule, having three
ls or internal divisions, each contain-
a single seed.

RICOSANTHES, a genus of plants
the class monœcia, and order synge-
sia, and in the natural system ranging
der the 34th order, cucurbitaceæ, seven
cies.

TRICOSTEMA, a genus of the didynamia gymnospermia class of plants, with a monopetalous ringent and falcated flower. The stamina are four extremely long filaments; and four roundish seeds are contained in the cup. Three species.

TRIDAX, a genus of the syngenesia polygamia superflua class of plants, with a radiated flower, and the lesser hermaphrodite ones of the disc monopetalous, and funnel-fashioned. The seeds are winged with down, and contained in the cup. One species.

TRIENTALIS, *chickweed winter green*, a genus of plants of the class heptandria, and order monogynia, and in the natural system ranging under the 20th order, rotaceæ. The calyx is heptaphyllous; the corolla is equal and plane, and is divided into seven segments; the berry is unilocular and dry. One species.

TRIFOLIUM, *trefoil* or *clover*, a genus of plants of the class diadelphia, and order decandria, and in the natural system ranging under the 32d order, papilionaceæ. The flowers are generally in round heads; the pod is scarcely longer than the calyx, univalve, not opening, deciduous. The leaves are three together. 51 species.

TRIGLA, *gurnard*, a genus of fishes of the order of thoracici. The generic character is, head large, mailed, and marked by rough lines; gill covers spiny; gill-membrane seven rayed; finger-shaped processes, in most species, near the pectoral fins. 14 species.

TRIGLOCHIN, a genus of plants of the class hexandria, and order trigynia, and in the natural system ranging under the fifth order, tripetaloidæ. The calyx is triphyllous; the petals are three; there is no style; the capsule opens at the base. Three species.

TRIGONELLA, *fenugreek*, a genus of plants of the class diadelphia, and order decandria, and in the natural system arranged under the 32d order, papilionaceæ. The vexillum and alæ are nearly equal and patent, resembling a tripetalous corolla. 12 species.

TRIGONIA, a genus of the diadelphia decandria class and order of plants. The calyx is five-parted; petals five, unequal; nect. two scales at the base of the germ; filaments, some barren; capsules leguminous, three-cornered, three-celled, three-valved. Two species.

TRIGONOMETRY. The business of this important science is to find the angles where the sides are given; and the sides of their respective ratios, when the angles are given; and to find sides and angles, when sides and angles are partly given. To effect this, it is necessary not only that the peripheries of circles, but also certain right lines in and about circles, be supposed divided into certain numbers of parts. The ancients, feeling the necessity of such a pre-division, portioned the circles into 360 equal parts, which they called degrees; each degree was again divided into 60 equal parts, called minutes; and each minute comprised 60 equal parts, called seconds. The moderns have improved upon this division by the addition of a nonius, or vernier, which may be carried to any extent, but is usual.

an arc measures
plement is 30 deg. 2.
tense, is a right line draw
other end of an arc. 3.
sine, of an arc, is a pe
ing from one end of an
drawn, at right angles th
other end of the arc. Her
an arc of 60 deg. must ha
radius, and its chord,
length, forming an equ
The secant and radius b
the centre, but all sines
vertical line passing thr
and invariably fall up
drawn perpendicular to

TRIGUERA, a genus o
monogynia class and ord
corolla is bell-shaped;
ry four-celled, two see
Two species.

TRIHILATÆ, from t
hilum, "an external m
the name of the 23d cl
Fragments of a Natural
ing of plants with three s
marked with an external
where they are fastened

TRILIX, a genus of th
polyandria monogynia.
three-leaved; corolla
berry five-celled, many
species.

TRILLION, in arithme
billions.

TRILLIUM, a genus of
trigynia class and order
calyx is three-leaved; co
relled; berry three-celle
cies.

TRIM *of a ship*, her bes
portion of ballast, and
masts, &c. for sailing.

TRINGA, *sandpiper*, a
belonging to the order of

RISETOUS, in entomology, three-
tled, applied chiefly to the tail of in-
, as in the ephemera.

RISPAST, in mechanics, a machine
three pullies, or an assemblage
three pullies for raising of great
ghts.

RITICUM, *wheat*, a genus of plants
the class triandria, and order digynia,
in the natural system ranging under
fourth order, gramina. The calyx is
alve, solitary, and generally contain-
three florets; the corolla is bivalve,
valve being bluntish, the other acute.
pecies.

RITOMA, a genus of insects of the
optera order. The generic character
antennæ clavate, the club perfoliate;
emarginate; anterior feelers hatch-
shaped; shells as long as the body.
species.

RITON, a genus of vermes mollusca.
generic character is, body long:
ath with an involute spiral probos-
; tentacula, or arms twelve, viz. six
each side, divided nearly to the base,
end ones cheliferous. There is only
gle species.

RIUMFETTA, a genus of the dode-
dria monogynia class of plants, the
lla of which consists of five linear,
t, obtuse petals, hollowed, and bent
kwards; the point is prominent be-
the apex; the fruit is a globose
sule, every where surrounded with
ed prickles, and contains four cells;
seeds are two, convex on one side
angular on the other; but only one
he two seeds of each cell usually ri-
s. 11 species.

RIXIS, a genus of the syngenesia
gamia class and order of plants.—
corollæ of the ray are trifid, seeds
y at the top, without any down;
pt. chaff. Three species.

ROCHAIC VERSE, in the Latin poe-
a kind of verse, so called because the
hees chiefly prevail, as the iambus
s in the iambic. It generally consists
even feet and a syllable; the odd feet,
the most part, consist of trochees,
gh a tribrachys is sometimes ad-
ed, except in the seventh foot; these
feet are likewise used in the other
es, as is also the spondæus, dacty
and anapæstus. The following is an
mple,

2 3 4 5
s | aut rex | aut po | eta | non quot |
6 7 8
annis | nasci | tur.

ROCHEE, in the Greek and Latin
ry, a foot consisting of two syllables;
first long and the second short, as in
words mūsă and sērvăt.

ROCHILUS, *humming-bird*, a genus
birds belonging to the order of picæ.—
rostrum is subulate, filiform, and lon-
than the head, the apex being tu-
ar; the upper mandible sheaths
lower. The tongue is filiform and
ulous, the two threads coalescing;
feet are slender and fit for walking;
tail has ten feathers. There are 65
cies, none of which are natives of
ain. *They are all remarkable* for the beauty of their colours, and most of them for the smallness of their size, though some are eight or nine inches in length. They are divided into two families, viz. those with crooked bills, and those with straight bills.

TROCHUS, a genus of vermes testacea: the generic character is, animal a limax; shell univalve, spiral, more or less conic; aperture somewhat angular or rounded; the upper side transverse and contracted: pillar placed obliquely. 120 species.

TROGON, or *curucia*, a genus of birds of the order picæ. The generic character is, bill shorter than the head, sharp edged, hooked, the mandibles serrate, at the edge; feet formed for climbing. Nine species.

TROLLIUS, *globe flower*, in botany, a genus of plants of the class polyandria, and order polygamia, and in the natural system ranging under the 26th order, multisiliquæ. The calyx is wanting; there are about 14 petals; the capsules are very numerous, ovate, and many seeded. Two species.

TRONAGE, the mayor and commonalty of the city of London, are ordained keepers of the beams and weights for weighing merchants commodities, with power to assign clerks, porters, &c. of the great beam and balance, which weighing of goods and wares, is called tronage.

TROPÆOLUM, the *Indian cress*, or *nasturtium*, a genus of the octandria monogynia class of plants, the flower of which consists of five roundish petals inserted into the divisions of the cup; the two upper petals are sessile; the three others have very long and barbated ungues: the fruit consists of three convex capsules, fulcated, and striated on one side, and angular on the other; the seeds are three, gibbous on one side, and angulated on the other, but upon the whole somewhat roundish, and striated deeply. Five species.

TROPHIS, a genus of the dioecia tetandria class and order of plants. There is no calyx and no female corolla; the male corolla is four petalled; the style is two-parted: berry one seeded. One species.

TROPHY, *tropæum*, among the antients, a pile or heap of arms of a vanquished enemy, raised by the conqueror in the most eminent part of the field of battle. The trophies were usually dedicated to some of the gods, especially Jupiter. The name of the deity to whom they were inscribed, was generally mentioned, as was that also of the conqueror.

TROVER is the remedy prescribed by the law, where any person is in possession of the property of another, which he unlawfully detains.

TROY WEIGHT, one of the most ancient of the different kinds used in Britain. The pound English troy contains 12 ounces, or 5760 grains.

TROY-WEIGHT, *Scots*, was established by James VI, in the year 1618, who enacted, that only one weight should be used in Scotland, viz. the French troy stone of 16 pounds, and 16 ounces in the pound. The pound contains 7600 grains;

and is equal to 17 oz. 6 dr. avoirdupois. The cwt. or 112 lb. avoirdupois, contains only 103 lb. 1¾ oz. of this weight, though generally reckoned equal to 104 lb. Though prohibited by the articles of union it is still used in weighing iron, hemp, flax, most Dutch and Baltic goods, meal, butchers meat, unwrought pewter and lead, and some other articles.

TRUCE, in war, denotes a suspension of arms, or a cessation of hostilities between two armies, in order to settle articles of peace, bury the dead, or the like.

TRUFFLES, in natural history, a kind of subterraneous puff ball, being a species of fungi, which grows under the surface of the earth.

TRUMPET, the loudest of all portable wind instruments, and consisting of a folded tube generally made of brass, and sometimes of silver.

TRUMPET, *marine*, a kind of monochord, consisting of three tables, which form its triangular body. It has a very narrow neck, with one thick string, mounted on a bridge, which is firm on one side, and tremulous on the other. It is struck with a bow by the right hand, while the thumb of the left is pressed on the string.

TRUMPET, *speaking*, is a tube from six to fifteen feet long, made of tin, perfectly straight, and with a very large aperture; the mouth-piece being large enough to receive both lips. It is used for magnifying sound, particularly that of speech, and thus causing it to be heard at a great distance.

TRUNCATED, in general, is an appellation given to such things as have, or seem to have, their points cut off.

TRUNNIONS, or *Trunnions of a piece of ordnance*, are those knobs or bunches of the gun's metal, which bear her up on the cheeks of the carriage.

TRUSS OF FLOWERS, is used by florists to signify many flowers growing together on the head of a stalk, as in the cowslip, auricula, &c.

TRUSS, is also used for a sort of bandage or ligature made of steel, or the like matter, wherewith to keep up the parts, in those who have hernias or ruptures.

TRUST, is a right to receive profits of land, and to dispose of the land in equity. And one holding the possession and disposing of it at his will and pleasure, are signs of trust.

TRUSTEE, one who has an estate, or money, put or trusted in his hands, for the use of another.

TUBE, in general, pipe, conduit, or canal; a cylinder, hollow within side, either of lead, iron, wood, glass, or other matter, for the air, or some other fluid, to have a free passage or conveyance through.

TUBE, in astronomy, is sometimes used for a telescope, or, more properly, for that part into which the lenses are fitted, and by which they are directed and used.

TUBIPORA, a genus of zoophyta. The generic character is, animal a nereis; coral consisting of erect, hollow, cylindrical, parallel aggregate tubes. Ten species.

TUBULARIA, a genus of zoophyta: stem tubular, simple or branched, fixed
by the base: animal proceeding fr
end of the tube, and having its head
ed with tentacula; 25 species.

TUFAS, beds of lime deposited
getables, which by their destruction
great lightness and porousness
mass.

TULBAGIA, a genus of plants
class and order hexandria mon
The corolla is funnel-form, with
leaved; capsule superior. Two s

TULIPA, *tulip*, a genus of plant
class hexandria, and order mono
and in the natural system rang
the 10th order, coronariæ. The c
hexapetalous and campanulat
there is no style; five species.

TUMOUR, or *Tumor*, in medic
surgery, a preternatural rising or
swelling on any part of the body.

TUN, or *Tun*, originally signifies a
vessel or cask of an oblong form b
in the middle, and diminishing to
its two ends, girt about with hoops
used for stowing several kinds of
chandize, for convenience of car
as brandy, oil, sugar, skins, hay
This word is also used for certain
of extraordinary bigness, serving
wine for several years.

TUN is also a certain measure
quids, as wine, oil, &c.

TUN is also a certain weight, wh
the burden of ships, &c. are com

TUNE, or *Tone*, in music, the pr
of sounds whereby they come with
relation of acute and grave to each

TUNGSTEN, a mineral found in
den, of an opaque white colour and
weight, whence its name tungs
ponderous stone. This ore was ex
by Scheele, who found that it was
posed of lime and a peculiar me
substance, which from its prope
called tungstic acid. The base
acid was found to contain a metal
was named tungsten, and which ex
tained from the acid mixed with ch

TUNGSTIC *acid*. The substance
tungstic acid by Scheele and ber
was discovered by Scheele in 1781
philosopher obtained it from the tu
of lime, by treating it with nitric a
ammonia alternately. The acid di
the lime, and the ammonia combine
the tungstic acid. The ammoniacal
tion, when saturated with nitric or
riatic acid, deposits a white pow
which is the tungstic acid of Schee

TUNICA, a kind of waistcoat or un
garment, in use amongst the Romans

TURBO, the *wreath*, in zoology, a g
of insects belonging to the order of ve
testacea. The animal is of the
kind; the shell consists of one spir
lid valve, and the aperture is orbic
66 species.

TURDUS, the thrush, a genus of b
belonging to the order of passeres.
bill is straight, bending towards the p
and slightly notched near the end o
upper mandible. The nostrils are o
half covered with a membrane; the
ners of the mouth are furnished w
few slender hairs, and the tongue is sl
ly jagged at the end, 136 species.

TURGESCENCE, among herbalists, den

the first young tender shoots, which plants annually put forth.

TURNAMENT, or *Tournament*, a martial sport, or exercise, which the antient cavaliers used to perform, to shew their bravery and address.

TURNERA, a genus of the pentandria trigynia class of plants, the flower of which consists of five petals obversely cordated, and sharp-pointed; the fruit is an oval, unilocular capsule, containing a great many oblong and obtuse seeds. Nine species.

TURNING, the art of forming hard bodies, as wood, ivory, or iron, into a round or oval shape, by means of a machine called a lathe, of which there are various kinds, and several instruments, as gouges, chisels, drills, formers, and screw-tales, used for cutting what is to be turned into its proper form as the lathe turns round. The lathe should be fixed in a place very well lighted; it should be immoveable, and neither too high nor too low. The puppets should neither be so low as to oblige the workman to stoop in order to see his work properly, nor so high that the little chips, which he is continually driving off, should come into his eyes.

To succeed in turning iron, it is necessary to have a lathe exceedingly strong in all its parts, and exceedingly well fixed. The puppets should be short, and the rest well fixed very near the work; the back of the rest should be two or three lines lower than the iron to be turned.

For turning ovals, a lathe of somewhat a different construction is used. The axis or spindle, having on it the pulley over which the band-cord passes for turning the lathe, is fixed between the two puppets so as to turn round easily; one end of it passes through one of the puppets, and to it is firmly fixed a circular plate of brass, so that it turns round along with the spindle. Upon this plate two brazen segments of circles are fastened, the circumferences of which correspond to the circumference of the plate, their chords are parallel and equally distant from the centre of the plate, so that they leave a distance between them. They have a groove in each of them; in these grooves another plate is placed, which exactly fills up the space between the two grooves, but is shorter than the diameter of the larger circular plate on which it is laid. This plate is made to slide in the grooves. To its centre is annexed a short spindle, on which the piece of wood to be turned is fixed. When the lathe is set a going, the circular plate moves round, and carries the piece along with it; the plate of brass on which the piece is fixed, being fixed loosely in the grooves already described, slides down a little every time that the grooves become perpendicular to the floor (and there are particular contrivances to prevent it from sliding down by these two motions com- circular one of the large plate, raight one of the small), the ence of the piece of wood to be ecessarily describes an oval; ges or other tools being applied in the usual manner, supported on the rest, it is cut into an oval accordingly. The small plate may be made to slide either more or less in the grooves; and by this contrivance the transverse diameter of the oval, or r er ellipse, may be made longer or short at pleasure.

TURNPIKE, a gat t up across a road watched by an officer for the purpose, in order to stop travellers, waggons, coaches, &c. to take toll of them towards repairing or keeping the roads in repair.

TURRÆ, a genus of plants of the class and order decandria monogynia. The calyx is one-leafed, bell-shaped, five-toothed, very small, permanent. Five species.

TURRITIS, *tower-mustard*, a genus of the tetradynamia siliquosa class of plants with a tetrapetalous cruciform flower; its fruit is an extremely long pod, containing numerous seeds. Eight species.

TUSSILAGO, *colt's-foot*, a genus of plants of the class syngenesia, and order polygamia superflua; and in the natural system ranging under the 49th order, compositæ. The receptacle is naked; the pappus simple; the scales of the calyx equal; of the same height as the disk, and somewhat membranaceous. 14 species.

TUTOR, in the civil law, is one chosen to look to the person and estate of children left by their fathers and mothers in their minority.

TUTORAGE, *tutela*, in the civil law, a term equivalent to guardianship in the common law, signifying an office imposed on any one to take care of the effects of one or more minors.

TYCHONIC SYSTEM or *Hypothesis*, an order or arrangement of the heavenly bodies, of an intermediate nature between the Copernican and Ptolemaic, or participating alike of them both.

TYMPAN, among printers, is a double frame belonging to the press, covered with parchment, on which the blank sheets are laid in order to receive the impression.

TYMPANUM, or *Tympan*, in mechanics, a kind of wheel placed round an axis or cylindrical beam, on the top of which are two levers or fixed staves, for the more easy turning the axis, in order to raise a weight required.

TYMPANUM *of a machine*, is also used for a hollow wheel, wherein one or more people, or other animals, walk to turn it; such as that of some cranes, calenders, &c.

TYPE, a copy, image, or resemblance of some model.

TYPE, among letter-founders and printers, the same with letter.

TYPHA, *cat's-tail*, a genus of plants of the class monoecia, and order triandria; and in the natural system ranging under the 3d order, calamariæ. The amentum of the male flower is cylindrical; the calyx is scarcely distinguishable; there is no corolla. The female has a cylindrical amentum below the male; the calyx is composed of villous hair; there is no corolla, and only one seed fixed on a capillary papus. Two species.

TYPOGRAPHY. See *Printing*.

is a term applied by mathematicians to such quantities as are considered in a variable or changeable state, either increasing or decreasing. Variable quantities are usually denoted by the last letters of the alphabet, z, y, x, &c; while the constant ones are denoted by the leading letters a, b, c. &c.

VARIANCE, in law, signifies any alteration of a thing formerly laid in a plea, or where the declaration in a cause differs from the writ, or from the deed upon which it is grounded.

VARIATION, in geography and navigation, is the deviation of the magnetical needle, in the mariner's compass, from the true north point, towards either the east or west; or it is an arch of the horizon, intercepted between the meridian of the place of observation and the magnetic meridian.

VARIOLÆ, the small-pox, in medicine.

VARNISH, a thick, viscid, shining liquor, used by painters, gilders, and various other artificers, to give a gloss and lustre to their works; as also to defend them from the weather, dust, &c

VARNISH, among medallists, signifies the colours antique medals have acquired in the earth.

VARRONIA, a genus of plants of the class and order pentandria monogynia. The corolla is five-cleft; drupe with a four-celled nut, nine species.

VATRIA, a genus of the polyandria monogynia class of plants, the flower of which consists of five oval and patent petals; and its fruit is a turbinated, coriaceous, and unilocular capsule, containing a single oval seed. One species.

VATICA, a genus of the dodecandria monogynia class and order of plants The calyx is five-cleft; petals five; anthers 15, sessile; four-celled. One species.

VAULT, in architecture, an arched roof, so contrived that the stones which form it sustain each other. Vaults are, on many occasions, to be preferred to soffits or ceilings, as they give a greater height and elevation, and are besides more firm and durable.

UBIQUITARIANS, in church-history, a sect who sprung up in Germany about the year 1590, and maintained that the body of Jesus Christ is ubique, every where, or in every place, at the same time.

VECTOR, in astronomy, a line supposed to be drawn from any planet moving round a centre, or the focus of an ellipsis, to that centre or focus.

VEER, a sea-term variously used. Thus veering out a *rope*, denotes the letting it go by hand, or letting it run of itself. It is not used for letting out any running rope except the sheet.

VEIN, among miners, is that space which is bounded with woughs, and contains ore, spar, canck, clay, chirl, croil, browheu, pitcher-chirt, cur, which the philosophers call the mother of metals, and sometimes soil of all colours When it bears ore, it is called a quick vein; when no ore, a dead vein.

VELEZIA, a genus of the pentandria digynia class and order of plants. The calyx is *filiform, five-toothed*; corolla five-petalled, small; capsules one-celled; seeds numerous, one species.

VELLA, a genus of the tetradynamia siliculosa class of plants, with a tetrapetalous cruciform flower; the stamina are six filaments, about the length of the cup; and the fruit is a globose, cristated, bilocular pod, containing a few roundish seeds. Two species.

VELVET, a rich kind of stuff, all silk, covered on the outside with a close, short, fine, soft shag, the other side being a very strong close tissue.

VENEERING, *Vaneering* or *Fineering*, a kind of marquetry, or inlaying, whereby several thin slices or leaves of fine woods, of different kinds, are applied and fastened on a ground of some common wood. There are two kinds of inlaying, the one which is the most common and more ordinary, goes no farther than the making of compartments of different woods; the other requires much more art, in representing flowers, birds, and similar figures. The first kind is properly called veneering the latter is more properly called marquetry. The wood used in veneering is first sawed out into slices or leaves about a line in thickness; *i. e.* the twelfth part of an inch. In order to saw them, the blocks or planks are placed upright, in a kind of sawing-press. These slices are afterwards cut into narrow slips, and fashioned divers ways, according to the design proposed; then the joints having been exactly and nicely adjusted, and the pieces brought down to their proper thickness with several planes for the purpose, they are glued down on a ground or block, with good strong English glue. The pieces being thus jointed and glued, the work if small, is put in a press; if large, it is laid on a bench covered with a board, and pressed down with poles or pieces of wood, one end of which reaches to the ceiling of the room, and the other bears on the board When the glue is thoroughly dry, it is taken out of the press, and finished, first with little planes, then with scrapers, some of which resemble rasps, which take off the dents, &c. left by the planes. After it has been sufficiently scraped, they polish it with the skin of a dog-fish, wax, and a brush, or polisher of shave-grass; which is the last operation.

VENTILAGO, a genus of the class and order of plants pentandria monogyna. The calyx is tubular; corolla, scales protecting the stamen, which are inserted in the calyx. One species.

VENTILATOR, a machine by which the noxious air of any close place, as an hospital, gaol, ship, chamber, &c. may be changed for fresh air.

VENTRILOQUISM, an art by which certain persons can so modify their voice, as to make it appear to the audience to proceed from any distance, and in any direction.

VENUE, in law, the neighbourhood whence juries are to be summoned for trial of causes.

VENUS, in astronomy, one of the inferior planets, revolving round the sun in an orbit between that of Mercury and the Earth.

VENUS, in zoology, a genus of insects belonging to the order of vermes testacea.

This animal is a tethys; the shell is bivalve; the hinge with three teeth near each other, one placed longitudinally and bent inwards.

VEPRECULÆ, diminutive from vepres, "a briar or bramble" the name of the 31st order in Linnæus's Fragments of a Natural Method.

VERATRUM, a genus of plants of the class polygamia, and order monœcia; and in the natural system arranged under the 10th order coronariæ. There is no calyx; the corolla has six petals; there are six stamina; the hermaphrodite flowers have three pistils and three capsules. Four species.

VERB, in grammar, a word serving to express what we affirm of any subject, or attribute to it.

VERBASCUM, a genus of plants of the class pentandria, and order monogynia; and in the natural system arranged under the 28th order, luridæ. The corolla is rotated, and rather unequal; the capsule is monocular and bivalved. Nineteen species.

VERBENA, a genus of plants of the class of diandria, and order of monogynia; and in the natural system arranged under the 40th order, personatæ. The corolla is funnel-shaped; calyx one of the teeth truncate; seeds two or four, naked or very thinly arilled; stem two or four. 23 species.

VERDEGRIS, is an acetat of copper, useful in the arts as a pigment.

VERDEROR, a judicial officer of the king's forest, chosen by the king's writ in the full county court of the same shire, within the forest where he dwells; he is sworn to maintain and keep the assizes of the forest, and to view, receive and enrol the attachments and presentments, of all manner of trespasses of vert and venison in the forest.

VERDICT, the answer of a jury, made upon any cause, civil or criminal, committed by the court to their examination, and this is twofold, general or special.

VERGE signifies the compass of the king's court, which bounds the jurisdiction of the lord steward of the household, and which is thought to have been 12 miles round.

The term verge is also used for a stick or rod, whereby one is admitted tenant to a copyhold estate, by holding it in his hand and swearing fealty to the lord of the manor.

VERGERS, certain officers of the courts of king's-bench and common-pleas, whose business it is to carry white wands before the judges. There are also vergers of cathedrals, who carry a rod tipped with silver before the bishop, dean, &c.

VERJUICE, a liquor obtained from grapes or apples, unfit for wine or cyder; or from sweet ones, whilst yet acid and unripe.

VERMES, the sixth class of animals in the Linnæan system, comprehending five orders.

VERMICELLI, a composition of flour, cheese, yolks of eggs, sugar, and saffron, reduced to a paste, and formed into long slender pieces, like worms, by forcing it with a piston through a number of little holes.

VERNIER, a scale adapted for the
duation of mathematical instruments.
This scale is derived from the follow
principle. If two equal right lines, or
cular arcs, A B, are so divided, that
number of equal divisions in B is one
than the number of equal divisions in
then will the excess of one division
be compounded of the ratios of one of
A, and of one of B to B. For, let A
tain 11 parts, then one of A to A is as
11, or $\frac{1}{11}$. Let B contain ten parts,
one of B to B is as 1 to 10, or $\frac{1}{10}$. So

$$\frac{1}{11}=\frac{11-10}{10\times11}=\frac{1}{10\times11}=\frac{1}{10}\times\frac{1}{11}.$$

Or if B contains n parts, and A con
$n+1$ parts; then $\frac{1}{n}$ is one part of B
$\frac{1}{n+1}$ is one part of A. and $\frac{1}{n}-\frac{1}{n+1}$

$$\overline{n+1}$$

$$\frac{n+1-n}{n\times n+1}=\frac{1}{n}\times\frac{1}{n+1}.$$

The most commodious division,
their aliquot parts, into which the deg
on the circular limb of an instru
may be supposed to be divided, de
on the radius of that instrument.

Let R be the radius of a circle in in
and a degree to be divided into p
each being $\frac{1}{p}$th part of an inch.

Now the circumference of a circ
parts of its diameter 2 R inches, is 3.14
× 2 R inches.

Then 360 deg : 3.1415926 × 2 R :: 1
:: $\frac{3.1415926}{360}$ × 2 R inches.

Or, 0.01745329 × R is length of on
gree in inches.

Or, 0.01745329 × R × p is the leng
1 deg. in pth parts of an inch.

But as every degree contains
such parts, therefore n=0.01745329
× p.

The most commodious perceptible
sion is $\frac{1}{8}$ or $\frac{1}{10}$ of an inch.

VERONICA, a genus of plants
class diandria and order monogyni
in the natural system arranged un
40th order, personatæ. The corolla i
cleft, wheel-shaped, with the lowe
ment narrower; capsules superio
celled. 37 species.

VERSE. See *Poetry*.

VERSED *sine of an arch*, a segme
the diameter of a circle, lying betwe
foot of a right sine, and the lower
mity of the arch.

VERTICAL *circle*, in astrono
great circle of the sphere passing t
the zenith and and nadir, and cut
horizon at right angles; it is otherw
led azimuth.

ICAL *plane*, in perspective, is a
erpendicular to the geometrical
assing through the eye, and cut-
perspective plane at right angles.
A, in anatomy, a bladder, a mem-
or skinny part, in which any hu-
contained.
CATORY, an external medicine,
o raise a blister.
, *wasp*, a genus of insects of the
menoptera. The generic charac-
outh with jaws, without probos-
er wings pleated; sting conceal-
lunated; body smooth. 140 spe-

RTILIO, *bat*, a genus of mamma-
e order primates. The generic
r is, teeth erect, sharp-pointed,
nated; hands palmated, with a
ne surrounding the body, and giv-
nimal the power of flight. 26 spe-

BULE, in architecture, a kind of
into a large building; being an
ce before the hall, or at the bot-
e staircase.
Y, a place adjoining to a church,
e vestments of the minister are
so a meeting at such place where
ster, churchwarden, and prin-
n of most parishes, at this day
parish vestry.
VIAN, a mineral found in lava,
y at Vesuvius, and formerly
ed with hyacinth. Its colour is
greenish. It is found in mass-
sually crystallized in rectangular
ed prisms. The primitive form
tals is the cube. The specific
from 3. 39 to 3. 4.
TION, in mechanics, a regular
l motion of a body, as a pendu-
, which, being freely suspended,
r oscillates, first this way, then

O, a genus of vermes infusoria.
eric character is, worm invisible
aked eye, very simple, round,
d. 20 species.
RNUM, a genus of plants of the
tandria, order trigynia, and in
ral system arranged under the
r, dumosæ. The calyx is quin-
te and above; the corolla divid-
ve lachinæ; the fruit a mono-
s berry. 23 species.
R, one who supplies the place of
The priest of every parish is
ctor, unless the prædial tithes
opriated, and then he is styled
d when rectories are appropri t-
s are to supply the rector's place.
AGE. For the most part vicar-
e endowed upon appropriations;
imes vicarages have been en-
ithout any appropriation of the
e; and there are several church-
the tithes are wholly impro-
and no vicarage endowed; and
e impropriators are bound to
curates to perform divine ser-

in smithery, and other arts em-
n metals, is a machine, or instru-
rving to hold fast any thing th y
rk upon, whether it is to be filed,
itted, &c.
hand, is a small kind of vice serving to hold the lesser works in, that require often turning about.

VICE is also a machine used by the glaziers to turn or draw lead into flat rods, with grooves on each side to receive the edges of the glass.

VICIA, a genus of plants of the class diadelphia, and order decandria; and in the natural system arranged under the 32d order, papilionaceæ. The stigma is bearded transversely on the lower side. 25 species.

VICINAGE. *Common of vicinage* is, where the inhabitants of two townships, which lie contiguous, have usually intercommoned with one another, the beasts of the one straying mutually into the other's fields without any molestation from either.

VILLAIN, or *Villein*, a man of servile or base degree.

VINCA, in botany, *periwinkle*, a genus of plants of the class pentandria, and order monogynia; and in the natural system arranged under the 30th order, contortæ. The corolla is twisted; there are two erect follicles; the seeds are naked. Five species.

VINEGAR is a liquid of a reddish or yellowish colour, a pleasant sour taste and an agreeable odour. Its specific gravity varies from 1.0135 to 1.0251, and it differs also in its other properties according to the liquid from which it has been procured. It is very subject to decomposition; but Scheele discovered that if it is made to boil for a few moments, it may be kept afterwards for a long time without alteration. Besides acetic acid and water, vinegar contains several other ingredients, such as mucilage, tartar, a colouring matter, and often also two or more vegetable acids. When distilled at a temperature not exceeding that of boiling water, till about two thirds of it have passed over, all these impurities are left behind, and the product is pure acid diluted with water. See *Acid* and *Chemistry*.

VINEYARD, a plantation of vines.

VIOL, a stringed instrument resembling in shape, and tone the violin, of which it was the origin; that impressive and commanding instrument being little more than an improvement of the old viol.

VIOLA, a tenor violin. This instrument is similar in its tone and formation to the violin, but its dimensions are somewhat greater, and its compass a fifth lower in the great scale of sounds.

VIOLA, a genus of plants of the class syngenesia, order monogynia; in the natural system arranged under the 29th order, campanaceæ. The calyx is pentaphyllous; the corolla five-petalled, irregular with a nectarium behind, horn-shaped; the capsule is above the germen, three-valved, monolocular. 43 species.

VIOLIN, or *Fiddle*, a well-known stringed instrument of brilliant tone and active execution. The four strings of which it consists, are tuned in fifths from each other. The pitch of the lowest string is G, under the second ledger line in the treble stave; consequently that of the next is D, under the first line of the stave; the pitch of the next above that

A on the second space; and that of the upper string, E on the fourth space.

VIOLONCELLO, a bass viol, containing four strings, the lowest of which is tuned to double C. The strings are in fifths, consequently the pitch of that next the gravest is C gamut; that of the next, D on the third line in the bass; and that of the upper string, A on the fifth line

VIRCETA, a genus of plants of the pentandria monogynia class and order. The calyx is five-notched; corolla funnel-form; stigma two-parted; capsule one celled, many-seeded. Two species.

VIRGO, in astronomy, one of the signs or constellations of the zodiac, and the sixth according to order.

VISCUM, a genus of plants of the class diœcia, order tetrandria, and in the natural system arranged under the 48th order aggregatæ. The male calyx is quadripartite; the antheræ adhere to the calyx; the female calyx consists of four leaves; there is no style; the stigma is obtuse; there is no corolla; the fruit is a berry with one seed. 12 species.

VISION. See *Optics*.

VISMEA, a genus of the dodecandria trigynia class and order of plants. The calyx is five-leaved, inferior, the corolla five-petalled; stigmas five; nect. two or three-celled. One species.

VITEX, the *chaste-tree*, a genus of the didynamia angiospermia class of plants, with a monopetalous, ringent, and bilabiated flower, each lip of which is trifid; the fruit is a quadrilocular, globose berry, containing four seeds. 14 species.

VITIS, *the vine*, a genus of the class pentandria, and order monogynia; and in the natural system arranged under the 46th order, pectoraceæ. The petals cohere at the top, and are withered; the fruit is a berry with five seeds. 12 species.

VITMANNIA, a genus of plants of the class and order octandria monogynia. The calyx is four-cleft; corolla four petalled; nect. a scale of the base of each filament; nut semilunar, one-seeded. One species.

VITRIOL, *martial*, or *sulphat of iron*. In commerce it is usually denominated green vitriol or copperas. It is not prepared by dissolving iron in sulphuric acid, but by moistening the pyrites which are found native in abundance, and exposing them to the open air. They are slowly covered with a crust of sulphat of iron, which is dissolved in water, and afterwards obtained in crystals by evaporation. Sometimes the salt is found ready-formed, either in a state of solution in water, or mixed with decayed pyrites. In some cases it is found necessary to roast the pyrites before they can be made to undergo sontaneous decomposition. Sulphat of iron has a fine green colour. Its crystals are transparent rhomboidal prisms, the faces of which are rhombs with angles of 79 deg. 50 min. and 100 deg. 10 min. inclined to each other at angles of 98 deg. 37 min. and 81 deg. 23 min. It has a very strong styptic taste, and always reddens vegetable blues. Its specific gravity is 1.8399. It is soluble in about two parts of cold water, and in 8ths of its weight of boiling water. It is insoluble in alcohol.

VIVERRA, the *weasel*, a genu
drupeds of the order of feræ.
neric character is, cutting-teeth
ish; canine teeth longer; tongue
smooth, in others aculeated bac
body of a lengthened form. Th
comprehends all the animals of
sel kind. 31 species.

VIVIPAROUS, in natural hist
epithet applied to such animals as
forth their young alive and perf
contradistinction to those that lay
which are called oviparous animals.

ULLAGE, in gauging, is so much
cask, or other vessel, as it wants of
full.

ULMUS, a genus of plants of the
pentandria, and order digynia, and
natural system arranged under the
order, scabridæ. The calyx is
fid; there is no corolla. The fruit
dry, compressed, membranaceous

ULVA, a genus of plants of the
cryptogamia, and order of algæ.
fructification is inclosed in a diap
membrane. 26 species.

UMBELLÆ, *umbels*, among b
the round tufts or heads of certain
set thick together, and all of an
height.

UMBELLIFEROUS PLANTS, ar
as have their tops branched and
out like an umbrella, on each
division of which there is growing
flower; such are fennel, dill, &

UMBER, or *Umbra*, with
painters, &c. a kind of dry dusky
earth, which, diluted with wa
to make a dark-brown colo
called with us a hair-colour.

UNCARIA, a genus of pl
class and order pentandria
The corolla is salver-shap
crowned with a gland; stigma
ed; peric. two-celled, m
Two species.

UNCIA, in general, a Lati
ing the twelfth part of any th
larly the twelfth part of a p
in English an ounce; or the
of a foot, called an inch.

UNCIÆ, in algebra, the
fixed before the letters of th
any power produced from a
sidual, or multinomial root.
fourth power of $a+b$, viz. a^{4}
$b^{2} + 4ab^{3} + b^{4}$, the unciæ a
being the same with what c
efficients.

UNDECAGON, is a poly
sides. If the side of a regul
is 1, its area will be 9,365639
of $73\frac{7}{11}$ degrees; and th
number is multiplied by the
side of any other regular u
product will be the area of
gon.

UNGULA, in geometry,
off a cylinder, cone, &c. by
ing obliquely through the b
of the curve surface, so call
semblance to the (ungula) ho
&c.

UNISON, in music, th

proceeding from
mber of vibrations
y two sonorous bo-

se Christians who
p one only self-ex-
o Jesus Christ, in
o, besides the F
n Jesus, and the
are, therefore, cal-
Unitarians are, by
ignorant persons.
, but the Socinians
because they paid
Son of God. The
learned, and flou-

hose who hold that
is designed for cor-
nsequently, all ra-
ultimately rendered
ove and mercy.
of the polyandria
rder of plants. The
six-petals; berries
Four species.
plants of the class
polygamia super-
ive-leaved, leaflets
nd ray five, recept.

ral history, a burn-
that occasionally
e, ashes, cinders,
peculiar to no cli-
cessary connection
tains, but seem to
a, being generally
; they frequently
hich belong to the
hes, sea-weed, and
itself. The most
re those of Etna and

enus of the didyna-
s of plants, the co-
of a ringent, sin-
cylindric, and twice
the limb is divided
nts; the fruit is a
sule; the seed is a
Eight species.
gy, a genus of ani-
order of vermes in-
round, simple, and

al history, a genus
the class and order
41 species.
scroll, used in the
capitals, whereof it
characteristic and

artesian philosophy,
ction of particles of
me way, and round

enus of vermes in-
character is, body
d furnished with ci-
Nearly sixty species.
mar, a letter which
ound in itself. In
re six in number:

ology, a genus be-
f *picæ*. The beak
, and something

blunt; the tongue is obtuse, triangular, entire, and very short; and the feet are fitted for walking. Ten species.

URANIA, a genus of the hexandria monogynia class and order of plants. There is no calyx; the corolla is two-petalled; nectarine two-leaved; capsule two-celled, many-seeded. There is one species.

URANIUM, a mineral found in Saxony, partly in a pure and partly in a mixed state. There are two varieties of these; the first of a blackish colour, quite opaque, tolerably hard, and with a specific gravity of about 7.5. The second is distinguished by a finer black colour, with here and there a reddish cast; by a stronger lustre, not unlike that of pit-coal; by an inferior hardness; and by a shade of green, which tinges its black colour when it is reduced to powder.

Uranium is of a dark-grey colour; internally it is somewhat inclined to brown.

URANOSCOPUS, star-gazer, a genus of fishes of the order jugulares. The generic character is, head large, depressed, rough; mouth furnished with an internal cirrus; gill-covers edged by a ciliated border: gill-membrane five-rayed. 2 species.

UREA, the constituent and characteristic matter of urine, may be obtained by the following process: Evaporate by a gentle heat a quantity of human urine, voided six or eight hours after a meal, till it is reduced to the consistence of a thick syrup. In this state, when put by to cool, it concretes into a crystalline mass. Pour at different times upon this mass four times its weight of alcohol, and apply a gentle heat; a great part of the mass will be dissolved, and there will remain only a number of saline substances. Pour the alcohol solution into a retort, and distil by the heat of a sand-bath till the liquid, after boiling some time, is reduced to the consistence of a thick syrup. The whole of the alcohol is now separated, and what remains in the retort crystallizes as it cools. These crystals consist of the substance known by the name of urea.

URENA, a genus of the monadelphia polyandria class of plants, the corolla whereof consists of five oblong, obtuse, connated petals, broader than the apex, and narrower at the base; the fruit is a round echinated capsule, with five angles, consisting of five cells, and made up of five valves; the seeds are solitary, roundish, and compressed. Eight species.

URIC ACID. Uric or lithic acid was discovered by Scheele in 1776. It is the most common constituent of urinary calculi, and exists also in human urine.

It has a brown colour; is hard, and crystallized in small scales. It has neither taste nor smell, is insoluble in cold water, but soluble in 360 parts of boiling water.

URINE. The properties of urine vary considerably, according to the constitution and health of the body, and the period when it is voided after taking food. The urine of a healthy person is of a light orange colour, and uniformly transparent. It has a slightly aromatic odour, in some degree resembling that of violets. It has a slightly acrid, saline, bitter taste. The specific gravity varies from 1.005 to 1.033. The aromatic odour, which leaves it as it

Urine is much
ous decompositio
process commen
the changes whicl
the quantity of th
When the propor
is considerable, th
rapid. This is ow
of substances, an
their attractions o
affinities of the
which fresh urine
to the facility with
posed. This substa
putrefaction into am
and acetic acid.
ammonia is always
is undergoing these
gelatine is deposi
mixed with mucila
bines with phosphor
phate of lime is p
bines also with pho
and forms a triple sa
the uric, benzoic, the
acids, are all saturate

URSA, the *bear*, in
common to two conste
ern hemisphere, ne
guished by major and

URSUS, *bear*, a ge
of the order feræ: th
is, front teeth six, both
the two lateral ones of
er than the rest, and lo
or ſecondary teeth at th
canine teeth solitary;
six on each side, the f
to the canine teeth;
snout prominent; eyes
nictating membrane. T

URTICA, *nettle*, a ger
class monœcia, and o
and in the natural syste

stove; then cut them out for use. You may make them of what colours you please, by tinging the paste with brazil or vermillion for red; indigo or verditer, &c. for blue; saffron, tumeric, or gamboge, &c. for yellow.

WAGER OF LAW, is a particular mode of proceeding, whereby in an action of debt brought upon a simple contract between the parties, without any deed or record, the defendant may discharge himself by swearing in court in the presence of compurgators, that he owes the plaintiff nothing, in manner and form as he has declared, and his compurgators swear that they believe what he says is true. It being at length considered, that this waging of law offered too great a temptation to perjury, by degrees new remedies were devised, and new forms of action introduced, wherein no defendant is at liberty to wage his law.

WAGERS. In general a wager may be considered as legal, if it is not an incitement to a breach of the peace, or to immorality; or if it does not affect the feelings or interest of a third person, or expose him to ridicule: or if it is not against sound policy.

WAGES, what is agreed upon by a master to be paid to a servant, or any other person that he hires to do his business for him.

WAIFS, are goods which are stolen and waved by a felon in his flight from those who pursue him, which are forfeited; and though waif is generally spoken of goods stolen, yet if a man is pursued with hue and cry as a felon, and he flees and leaves his own goods, these will be forfeited as goods stolen; but they are properly fugitive's goods, and not forfeited till it is found before the coroner, or otherwise of record, that he fled for the felony.

WAKE *of a ship*, is the smooth water astern when she is under sail: this shews the way she has gone in the sea, whereby the mariners judge what way she makes. For if the wake is right astern, they conclude she makes her way forwards; but if the wake is to leeward a point or two, then they conclude she falls to the leeward of her course.

WALE, or *Wales*, in a ship, those outermost timbers in a ship's side on which the sailors set their feet in climbing up.

WALKERIA, a genus of plants of the class and order pentandria monogynia. The calyx is five parted, inferior; corolla five petalled; drupes five, one-seeded; nuts reniform. One species.

WALL, the principal part of a building, as serving both to inclose it and support the roof, floors, &c.

WALLENIA, a genus of plants of the class and order tetrandria monogynia. The calyx is four-cleft; corolla tubular, four-cleft; berry one-seeded. One species.

WALNUT-TREE. See *Juglans*.

IA e monadel-
, the flow-
petals, ver-
e fruit is an
e, vertically
ingle, obtuse,
st at the top. Six species.

WANMANNIA, a genus of plants of the class octandria, order monogynia, and arranged in the natural classification with those plants the orde f which is doubtful. The calyx is fo eaved, the corolla has four petals, an he capsule is bilocular and birostrat Four species.

WAPENTAKE, fr the Saxon, the same with what we a hundred, and more especially us n the northern counties beyond the r Trent.

WAR. The too frequent recurrence of this great and detestable calamity, unfortunately renders a definition of the word unnecessary. If we were called upon to define it, we should say, it is the wanton destruction, the cold-blooded slaughter, of the human race; we should call it an accumulation of every sin that degrades and vilifies mankind: we should mark it as a practice that diffuses misery and perpetuates vice; we should say, that if there is a burlesque upon the boasted reason of man it is this; when millions meet to murder each other for a quarrel in which, in general, they have not individually the smallest interest. The poet who wrote

> "One murder makes a villain, millions
> a hero," &c.

deserves a statue of gold; and the writer of that verse may lift his head in the proudest assembly, and avow his principles in the face of the world.

WARDEN, one who has the charge or keeping of any person or thing, by office.

WARDMOTE, in London, is a court so called which is kept in every ward of the city.

WARP, in the manufactures, is the threads, whether of silk, wool, linen, hemp, &c. that are extended lengthwise on the weaver's loom; and across which the workman by means of his shuttle passes the threads of the woof, to form a cloth, ribband, fustian, or other stuff.

WARRANT, a præcipe under hand and seal, to bring any offender before the person granting it; and warrants of commitment are issued by the privy council, a secretary of state, or justice of the peace, &c. when there has been a private information, or a witness deposed against an offender.

WARRANT *of attorney*, is an authority and power given by a client to his attorney, to appear and plead for him; or to suffer judgment to pass against him by confessing the action by nil dicit, non sum informatus, &c.

WARRANTY, a promise or covenant by deed, made by the bargainor, for himself and his heirs, to warrant or secure the bargainee and his heirs against all men, for the enjoying any thing agreed on between them.

WARREN, is a franchise or place privileged, by prescription or grant from the king for the keeping of beasts and fowls of the warren; which are coneys, partridges, pheasants, &c.

WASH, among distillers, the fermentable liquor used by the malt-distillers.

WASTE, is the committing any spoil or destruction in houses, lands, &c. by tenants, to the damage of the heir, or of him in reversion or remainder; whereupon the writ or action of waste, is brought for the recovery of the thing wasted, and damages for the waste.

WATCH, in the art of war, a number of men posted at any passage, or a company of the guards who go on the patrole. At sea, the term watch denotes a measure or space of four hours, because half the ship's company, watch and do duty in their turns, so long at a time, and they are termed starboard watch, and larboard watch.

WATCH is also used for a small portable movement or machine for the measuring of time, having its motion regulated by a spiral spring.

The Plate 2. Watch-work, explains the construction of a common pocket-watch, The moving power is a spiral steel spring (fig. 3), which is coiled up close by a tool for the purpose, and put into a brass box (fig. 2) called the barrel: the spring has a hook at its outer end, which is put through a hole in the side of the barrel, and riveted; the inner end has an oblong opening cut through it, to receive a hook upon the barrel arbor (fig. 6); this arbor goes through the bottom of the barrel, and is square to hold a worm-wheel *d*, (fig. 5, which is turned round by a worm *b*; the ends of the arbor project below this, and it is pivoted into the lower plate A (fig. 8) of the watch: the top of the barrel has a cover put over it, through which the pivot of the arbor projects, and works in a socket in the upper plate D.

The barrel thus mounted has a steel chain *a*, (figs. 1 and 8.) hooked to its upper end, and coiled round it; the other end of this chain is hooked to the lower part of the fusee E (figs. 1 and 8). It is evident that when the fusee is turned by the watch key, it will wind the chain off the barrel on itself; and as one end of the spring is fastened to the barrel, and the other is hooked to the arbor (which is prevented from turning by the worm-wheel beneath) the spring will be coiled up into a smaller compass than it was before, and by its reaction will, when the watch key is taken off, turn the fusee, and keep the watch going. The fusee has a spiral groove cut round it, as shewn in fig. 4, in which the chain lies: this groove is cut by an engine, so that the chain shall pull from the smallest part of the fusee, when the spring is wound up, and act with its greatest force; and gradually increases in size as the spring unwinds and acts with less power, so that the effect upon the great wheel *c* (figs. 1, 8, and 7) may be always the same, and cause the watch to go with regularity; and this effect can be at any time increased or diminished by turning the worm *b* (fig. 5) which coils the spring up closer, and causes it to act with greater force, or vice versa.

The fusee (fig. 4) has a ratchet wheel, at its lower end, which takes into a click fixed in a hollow cut in the great wheel (fig. 7), in order that when the watch is winding up, the fusee may slip round without the great wheel; and that when the spring draws it round in the other direction, it may move the great wheel with it, and the other wheels of the watch. The great wheel *c*, has 48 teeth, on its

circumference, which tak
a pinion of 12 teeth, ha
arbor with the centre wh
which has 54 teeth in
leaves on the arbor of th
and fig. 13; the third w
and turns a pinion of six
contrate wheel *i*, and fig. 1
cut parallel to its axis,
pinion of six leaves, ha
wheel *k*, fig. 8, 12, and 1
arbor of this wheel run
F (fig. 8, and fig. 15) ca
fixed to the upper pla
in a small piece fixed
called the counter pot
the two plates are put
lance-wheel pinion co
teeth of the contrate wh
wheel has 15 teeth, by w
balance *l*, (figs. 8 and
arbor of the balance, w
verge, has two pallet
nearly at right angle
there are acted upon
wheel, as shewn in
lower pallet is opposit
with one of the teeth of
which, as it turns roun
let round and the balan
balance has made abou
turn; the tooth of the
slips off and escapes;
watch would run down
upper pallet at that ins
tooth on the opposite
wheel, which, as it mo
direction, pushes the
till the tooth escapes th
pallet then engages th
But for the better regu
the balance has a very
16), called the pendulu
inner end fixed to the
the balance, and the o
a stud fixed to the up
of the watch, so that i
only in one position,
either way by the b
spring will have a ten
the same position agai
er pallet for instance,
tooth of the balance w
spring is strained, a
lance to its point of r
the balance wheel lo
pallet by the action
and when the balanc
push the balance beyo
the other way, it move
it has the elasticity of
to overcome.

It is evident that b
weakening the spring,
balance can be regul
by a contrivance shew
the under side of it is
of brass screwed to th
plate, close under th
one place it is hollowe
wheel *n*, of 30 teeth,
ment of a wheel *p*, cal
moves round in a circ
projecting leaf *q*, with
ceive the pendulum
turning the wheel w
square put this w

WATCH WORK.

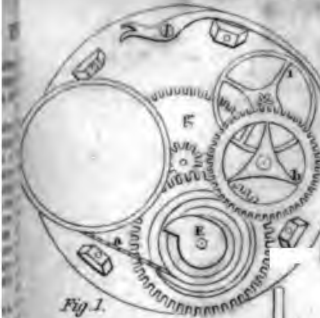


Fig. 1.

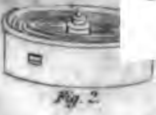


Fig. 2.

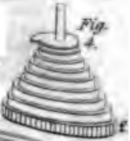


Fig. 4.

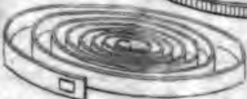


Fig. 3.

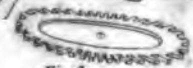


Fig. 7.

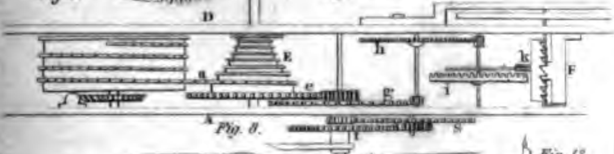


Fig. 8.

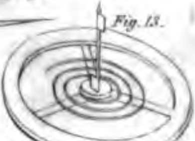


Fig. 13.

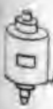


Fig. 6.

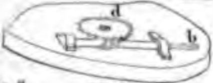


Fig. 5.

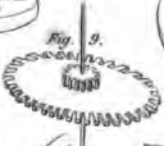


Fig. 9.

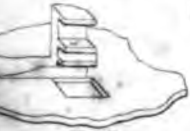


Fig. 15.

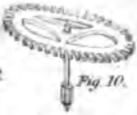


Fig. 10.

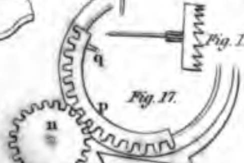


Fig. 12.

Fig. 17.

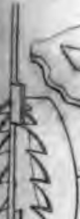


Fig. 14.

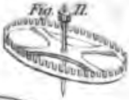


Fig. 11.

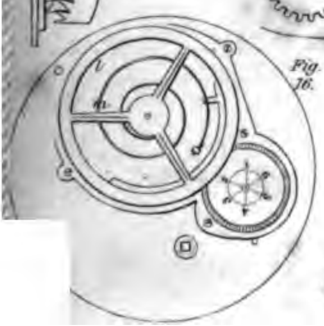


Fig. 16.

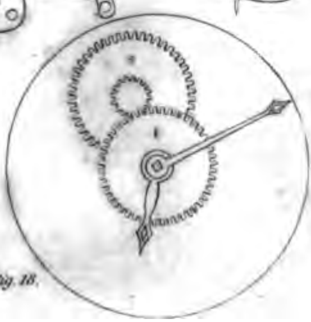


Fig. 18.

Published May 1 [illegible], by R. Phillips, Bridge Street, Blackfriars, London. Cooper ſculp.

r shortened, so as to give it a
wer, and make the balance
ter or slower; the arbor of
has a dial *r*, (fig. 16) upon it
s to set it by. The upper pi-
rge runs in a cock screwed to
late, as shewn in fig. 8, which
alance and protects it from
d the lower pivot works in
of the pottance; the socket
of the balance wheel is made
iece of brass, which slides in
ade in the pottance, as shewn
that by drawing the slide in or
h of the balance wheel shall
ne pallet before it takes the

is so adjusted by the pendu-
that the balance shall vibrate
the centre wheel round once
the spindle of this projects
lower plate (fig. 8), and has a
n it, which is square at the
rries the minute hand; the
f this tube has a pinion of
t, which turns the minute
s. 8 and 18) of 48, and its pi-
which moves the hour wheel
h the spindle of this is a
is put over the tube of the
l, and has the hour hand
indicate the time upon the

This very useful and neces
resents itself to our notice in
t forms, namely, in its liquid
state of vapour or steam, and
frozen state. Water, when
n its most simple state, for its
nds on a certain quantity of
ch enters into combination
insinuating itself between the
the water, renders them ca-
ving in all directions. We are
th water either from the at-
hence it descends in the form
snow, or from the earth, which
n in springs and rivulets. In
ase, the watery exhalations
the sea, and the surface of
the sun's heat, form clouds,
les being afterwards condens-
again in showers. In the latter,
ich falls on the tops of moun-
ther lofty situations, pene-
rth, and, after passing down-
ks forth at some fissure or
distance from its source.
OLOURS. The general or
rs, and the various species
r painting in water-colours,
:

	Browns,
	Spanish brown
ite	Spanish liquorice
	Umber
e	Bistre
	Burnt Terra de Sienna
	Unburnt ditto
	Reds.
-stones	Native cinnabar
	Burnt ochre
ck	Indian red
	Red lead
.	Minium
	Lake

Greens,	*Reds.*
Green verditer	Vermilion
Grass-green	Carmine
Sap-green	Red ink
Verdigrise distilled	Indian lake
Blues.	*Yellows.*
Sanders blue	English ochre
Terre-blue	Gall-stone
Blue verditer	Gamboge
Indigo	Masticot
Litmus	Ochre de luce
Smalt	Orpiment
Prussian blue	Roman ochre
Light ditto	Dutch pink
Ultramarine	Saffron-water
Ultramarine ashes	King's yellow
Blue bice	Gold yellow
See *Painting*.	French berries.

WATER COURSE. A water course does not begin by prescription, nor assent, but begins ex jure naturæ, having this course naturally; and cannot be diverted.

WATERMEN. In London the lord mayor and court of aldermen have much power in governing the company of watermen, and appointing the fares for plying on the river Thames; and justices for Middlesex, and other adjoining counties, have also power to hear and determine offences, &c. See 10 G. II. c. 31.

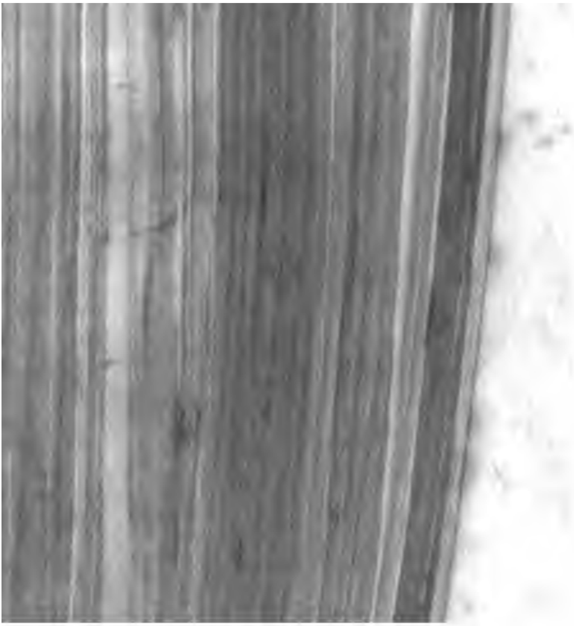
WATER-SPOUT, an extraordinary aqueous meteor, most frequently observed at sea. It is a truly formidable phenomenon; and is indeed capable of causing great ravages. It commonly begins by a cloud, which appears very small, and which mariners call the squall; which augments in a little time into an enormous cloud of a cylindrical form, or that of a reversed cone, and produces a noise like an agitated sea, sometimes emitting thunder and lightning, and also large quantities of rain or hail, sufficient to inundate large vessels, overset trees and houses, and every thing which opposes its violent impetuosity.

WATER-WORKS, in general, denote all manner of machines moved by, or employed in raising or sustaining water; in which sense water-mills of all kinds, sluices, aqueducts, &c. may be called water-works.

WATSONIA, a genus of the class and order triandria monogynia. The calyx is six-parted; stigma three, bifid; capsules triangular. Six species.

WAX. The upper surface of the leaves of many trees is covered with a varnish, which may be separated and obtained in a state of purity, and is found to possess all the properties of bees'-wax: hence it is justly inferred that wax is a vegetable product, and that the bees extract it unaltered from the leaves of trees and other vegetable substances that contain it. Several plants contain wax in such abundance as to make it worth while to extract it from them.

WAY, a road, or passage. A way may be by prescription, as if the owners and occupiers of such a farm have immemorially used to cross another's ground; for this immemorial usage supplies an original grant. A right of way may also arise by act and operation of law; for if a man grants to another a piece of ground in the middle of his field, he at the same time tacitly gives him a way to come at



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of this tube has a pinion of
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arth, and, after passing down-
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WAY *of a ship*, is sometimes used for her wake or track. But more commonly the term is understood of the course or progress which she makes on the water under sail: thus when she begins her motion, she is said to be under way.

WAYGHTES, or *Waits*. This noun formerly signified hautboys; and, which is remarkable, has no singular number. From the instruments its signification was, after a time, transferred to the performers themselves; who being in the habit of parading the streets by night with their music, occasioned the name to be applied generally to all musicians who followed a similar practice. Hence those persons who annually, at the approach of Christmas, salute us with their nocturnal concerts, were, and are to this day, called wayghtes.

WEATHER-GLASSES, are instruments contrived to indicate the state or disposition of the atmosphere, and the various alterations in the weather: such are barometers, thermometers, hygrometers, &c.

WEAVERS. The wages of journeymen weavers in London are to be settled by the lord mayor, recorder, and aldermen. Masters giving more wages than is appointed, to forfeit 50*l.* and journeymen demanding, or combining to demand more, to forfeit 40*s.* or be imprisoned three months.

WEAVING-LOOM. See *Loom*.

WEB, a tissue, or texture, formed of threads interwoven with each other; some whereof are extended in length, and called the warp; and others drawn across, and called the woof.

WEBERA, a genus of plants of the class and order pentandria monogynia. It is contorted; berry inferior, two-celled; cells one-seeded; stigma club-shaped; calyx-five cleft. Three species.

WEIGELIA, a genus of plants of the class and order pentandria monogynia. The calyx is five-leaved; corolla funnel-form; style from the base to the germ; stigma peltate; seed one. Two species.

WEIGH, *Way*, or *Wey*, *waga*, a weight of cheese, wool, &c. containing 256 pounds avoirdupoise. Of corn, the weigh contains forty bushels; of barley or malt six quarters. In some places, as Essex, the weigh of cheese is 300 pounds.

WEIGHT, *gravity*, in physics, a quality in natural bodies whereby they tend downwards, towards the centre of the earth.

WEIGHT, *pondus*, in mec
thing to be raised, sustain
a machine, or any thing th
ner resists the motion to b

WEIGHT, in commerc
dy of a known weight, app
to the balance against othe
weight is required.

WEIGHTS, *Modern E*
twenty-seventh chapter o
is, the weights all over En
the same; but for differe
there are two different
weight and avoirdupois w
gin from which they are t
grain of wheat gathered
the ear.

In troy weight, twen
grains make a pennyweig
ty pennyweights make
twelve ounces one pound

By this weight we we
jewels, and liquors. The
so use the troy pound, ou
but they differ from the r
mediate divisions. They
into eight drachms; the d
scruples, and the scru
grains.

In avoirdupois weigh
tains sixteen ounces, bu
by near one twelfth than
this latter contains 48
former only 438. The ou
drachms: 8 ounces aver
equal to 73 ounces troy,
troy equal to 14 pounds av

By avoirdupois weight a
cury, and grocery ware
wool, tallow, hemp, drug

Table of Troy Weigh
the Goldsmi

Grains.		
24	Pennywe	
480	20	C
5760	240	

Apothecarie

Grains.		
20	Scruple.	
60	3	D
480	24	
5760	288	

Table of Avoirdupois Weight.

Scruples.					
3	Dram.				
24	8	Ounce			
384	128	16	Pound.		
43008	14336	1792	112	Quintal, or hundr	
860160	286720	35840	2240	20	Ton.

ion gives the following com-
ween troy and avoirdupois

nds are equal to 144 avoirdu-
ounds.
ces are equal to 192 avoirdu-
unces.
und contains 5760 grains.
pois pound contains 7000

pois ounce contains 437½

pois dram contains 27.34375

nd contains 13 oz. 2.651428576
avoirdupois.
pois lb. contains 1 lb. 2 oz.
s. 16 gr. troy.
the avoirdupois lb. is to the lb.
o 144, and the avoirdupoise oz.
oz. as 437½ is to 480.
eyers, jewellers, &c. have a
lass of weights for gold and
ones, viz, *carat* and *grain*;
er, the *penny-weight* and *grain*.
ers have also a peculiar sub-
the troy grain: thus, divid-

rain into 20 mites,
nite into 24 droits,
roit into 20 periots,
eriot into 24 blanks.
ers in wool have likewise a
et of weights, viz. the *sack*,
stone, and *clove*; the propor-
ch are as below, viz.
ack containing 2 weighs,
weigh - - - 6½ tods,
od - - - - 2 stones,
one - - - 2 cloves,
love - - - 7 pounds.
cks make a last, or 4368 pounds.
r.
old hay, or 60 lb. new hay,
a truss.
straw make a truss.
s make a load, of hay or straw.
ke a stone.
glass a stone.
s *and Measures*. The standard
s was originally kept at Win-
hich measure was by the law of
r, ordained to be observed
e kingdom.
35 G. III. c. 102, the justices
sessions in every county, are
o appoint persons to examine
s and balances within their
jurisdictions. These inspec-
eize and examine weights in
, and seize false weights and
and the offender, being con-
fore one justice, shall be fined
20s. Persons obstructing the
to forfeit from 5s. to 40s. In-
o be recompensed out of the
e. Standard weights to be
by the sessions out of the
e, and produced to all persons
the production thereof. Infor-
o be within one month.
ENNIA, a genus of plants of the
order octandria digynia. The
ur-leaved; corolla four-petalled;
-celled, two beaked. Six species.
NG HEAT, in smithery, a de-
at given to iron, &c. sufficient
ny two *bars* or *pieces of iron*

unite by a few strokes of the hammer, and form one piece.

WESTRINGIA, a genus of plants of the didynamia gymnospermia class and order. The calyx is half five-cleft, five-sided; corolla reversed; four segments, longest erect, cloven; stam. distant, two shorter abortive. One species.

WHALE. See *Balæna*.

WHEAT, See *Triticum*, and *Husbandry*.

WHEAT-EAR. See *Motacilla*.

WHEEL, in mechanics, a simple machine, consisting of a round piece of wood, metal, or other matter, which revolves on an axis. The wheel is one of the principal mechanic powers; it has place in most engines; in effect, it is of an assemblage of wheels that most of our engines are composed.

WHEEL-ANIMALS, *brachionus*, a genus of animalcules which have an apparatus of arms for taking their prey.

WHIRLPOOL, an eddy, vortex, or gulph, where the water is continually turning round. These in rivers are very common, from various accidents, and are usually very trivial, and of little consequence. In the sea they are more rare but more dangerous.

WHIRLWIND, a wind that rises suddenly, is exceedingly rapid and impetuous, in a whirling direction, and often progressively also; but it is commonly soon spent. Dr. Franklin, in his Physical and Meteorological Observations, read to the Royal Society in 1756, supposes a whirlwind and a water spout to proceed from the same cause: their only difference being, that the latter passes over the water, and the former over the land. This opinion is corroborated by the observations of many others, who have remarked the appearances and effects of both to be the same. They have both a progressive as well as a circular motion; they usually rise after calms and great heats, and mostly happen in the warmer latitudes: the wind blows every way from a large surrounding space, both to the water-spout and whirlwind; and a water-spout has, by its progressive motion, passed from the sea to the land, and produced all the phenomena and effects of a whirlwind; so that there is no reason to doubt that they are meteors arising from the same general cause, and explicable upon the same principles, furnished by electrical experiments and discoveries.

WHISPERING-PLACES depend upon this principle: if the vibrations of the tremulous body are propagated through a long tube, they will be continually reverberated from the sides of the tube into its axis, and by that means prevented from spreading, till they get out of it: whereby they will be exceedingly increased, and the sound rendered much louder than it would otherwise be.

WHIST, a well-known game at cards, which requires great attention and silence; hence the name. This game is played by four persons, who cut for partners; the two highest and the two lowest are together, and the partners sit opposite to each other; the person who cuts the lowest card is to deal first, giving one

for four points towards th
game consisting of ten poi
nours are reckoned after tl
above six tricks reckoning
the game.

WICKLIFFISTS, or *Wic*
gious sect which sprung up
the reign of Edward III. and
from John Wickliff, doctor
of divinity in the universit
who maintained that the su
sacramental bread and wi
unaltered after consecratio
sed the doctrine of purgator
auricular confession, the
saints, and the worship of
maintained that children
without being baptised; th
administer confirmation; th
to be only two orders in the
of priests, and that of deacc
an English version of the Bi
posed two volumes, called
is, Truth, from which John
most of his doctrines.

WIDOW, a woman who
husband by death. In
throughout the province of
dow of a freeman, is by c
to her apparel, and the fu
bed-chamber, called the w
ber.

WIFE. After marriage,
the wife, in judgment of la
to the will of the husband, a
monly said a feme covert ha

WILDERNESS, in garden
grove of large trees, in a
den, in which the walks a
made either to intersect eac
gles, or have the appearance
and labyrinths.

WILL AND TESTAME
Every person capable of bin
by contract, is capable of m

All wines contain an acid, alco-
extract, aroma, and colouring
he presence and nature of each
rinciples may be ascertained in
ing way. 1. Acid. All wines, even
and mildest, redden litmus, and
contain an acid. This abounds
chiefly in the thin wines of wet
limates, where the grape juice
ntains but a small portion of su-
n wine has been boiled to ex-
randy, the liquor which remains
, and is thrown away as useless,
auseous fluid with an acrid and
our. When filtered and allowed
at rest for a time, it deposits a
of extractive matter, becomes
ith mould, and then contains a
uantity of acetous acid, which
eparated by distillation. The
vever not entirely acetous, as
ll after standing a considerable
precipitates and forms an inso-
with lime water, and with the
ts of silver, lead, and mercury,
be the malic acid mixed with a
, both of which are converted
r by spontaneous decomposi-
wines that contain the greatest
f these acids yield the worst
r is there any method yet
eparating or neutralizing the
materially injuring the quali-
ng the quantity of the ardent
cohol. The existence of this
mode of extraction by distil-
n fully described under the
The quantity of alcohol va-
ly. The strong, rich, full-
of the warmer wine coun-
as much as a third of ar-
st the thin light wines will
nore than about one six-
me strength. 3. Tartar.
has also been fully de-
er place. Tartar is not
ct of the fermentation of
contained in must,
quantity. 4. Extract.
bundance of extractive
erially assists the fer-
afterwards found, in
ees, but another por-
d from the wine by
so extract that mixes
tartar. By age the
matter diminishes.
possess a peculiar
ch would indicate a
ple, but it has never
rm of essential oil,
aller quantity by
r mode. To give
uld be fermented
ng matter. The
contains a good

solves therein. We may
natural colour of wine is
dily destroyed by the add
burnt charcoal in pretty f
colour of red wine in the s
receive it is not entire
grape, but is given by o
substances, which howeve
noxious.

WINNOWING MACHIN
of this sort are in pretty gene
thrashing-mills, to which the
tached, are not erected; they
different principles according
circumstances

WINTERA, a genus of plant
polyandria, and order pentagyn
The natural system arranged un
order, holoraceæ. The calyx
lobed; there are six or twelv
there is no style; the fruit is
which is club-shaped as well a
men. Three species.

WIRE, a piece of metal drawn
the hole of an iron into a thread
ness answerable to the hole it
through.

WITHERINGIA, a genus of p
the class and order tetrandria mo
The corolla is sub-campanulate
very small, four-toothed; peri
two-celled. One species.

WITZENIA, a genus of plant
class and order triandria monogyn
corolla is one-petalled; stigma
nate; capsule superior. One spec

WITHERNAM, in law, a writ
where a distress is driven out of th
ty, and the sheriff cannot make deli
to the party distrained; in that
writ is directed to the sheriff, co
ing him to take as many of the b
goods, of the party into his
till he make deliverance of the
tress.

WITNESS, one who is sworn
evidence in a cause. If a man is
naed as a witness upon a trial,
appear in court on pain of 100*l*. to
feited to the king, and 10*l*. togeth
damages equivalent to the loss su
by the want of his evidence to th
aggrieved.

But witnesses ought to have a r
ble time, that their attendance u
court may be of as little preju
themselves as possible; and the
king's-bench held, that notice at t
afternoon to attend the sitting th
ing at Westminster was too short
Where a witness cannot be pres
trial, he may, by consent of the
and defendant, or by rule of co
examined upon interrogatories
judge's chambers. No wi
appear to

for four points game consisting of ten points. The honours are reckoned after the tricks; all above six tricks reckoning also towards the game.

WICKLIFFISTS, or *Wicklifites*, a religious sect which sprung up in England in the reign of Edward III. and took its name from John Wickliff, doctor and professor of divinity in the university of Oxford, who maintained that the substance of the sacramental bread and wine remained unaltered after consecration, and opposed the doctrine of purgatory, indulgences, auricular confession, the invocation of saints, and the worship of images. He maintained that children may be saved without being baptised; that priests may administer confirmation; that there ought to be only two orders in the church, that of priests, and that of deacons. He made an English version of the Bible, and composed two volumes, called Alethia, that is, Truth, from which John Huss learned most of his doctrines.

WIDOW, a woman who has lost her husband by death. In London, and throughout the province of York, the widow of a freeman, is by custom entitled to her apparel, and the furniture of the bed-chamber, called the widow's chamber.

WIFE. After marriage, all the will of the wife, in judgment of law, is subject to the will of the husband, and it is commonly said a feme covert has no will.

WILDERNESS, in gardening, a kind of grove of large trees, in a spacious garden, in which the walks are commonly made either to intersect each other in angles, or have the appearance of meanders and labyrinths.

WILL AND TESTAMENT, in law. Every person capable of binding himself by contract, is capable of making a will. Also a male infant of the age of 14 years and upwards, and female of 12 years and

WINE. All wines contain an acid, alcohol, tartar, extract, aroma, and colouring matter. The presence and nature of each of these principles may be ascertained in the following way. 1. Acid. All wines, even the softest and mildest, redden litmus, and therefore contain an acid. This abounds however chiefly in the thin wines of wet and cold climates, where the grape juice or must contains but a small portion of sugar. When wine has been boiled to extract the brandy, the liquor which remains in the still, and is thrown away as useless, is a sour nauseous fluid with an acrid and burnt flavour. When filtered and allowed to remain at rest for a time, it deposits a good deal of extractive matter, becomes covered with mould, and then contains a notable quantity of acetous acid, which may be separated by distillation. The acid is however not entirely acetous, at least not till after standing a considerable time, for it precipitates and forms an insoluble salt with lime water, and with the soluble salts of silver, lead, and mercury, appears to be the malic acid mixed with a little citric, both of which are converted into vinegar by spontaneous decomposition. The wines that contain the greatest quantity of these acids yield the worst brandy, nor is there any method yet known of separating or neutralizing the acid without materially injuring the quality, or lessening the quantity of the ardent spirit. 2. Alcohol. The existence of this principle and mode of extraction by distillation has been fully described under the article *Brandy*. The quantity of alcohol varies prodigiously. The strong, rich, full-bodied wines of the warmer wine countries will yield as much as a third of ardent sprit; whilst the thin light wines will often give no more than about one sixteenth of the same strength. 3. Tartar. This substance has also been fully described in its proper place. Tartar is not altogether a product of the fermentation of wine, since it is contained in must, though in small quantity. 4. Extract. Must contains an abundance of extractive matter, which materially assists the fermentation, and is afterwards found, in part at least, in the lees, but another portion may be obtained from the wine by evaporation. It is also extract that mixes with and colours the tartar. By age the quantity of extractive matter diminishes. 5. Aroma. All wines possess a peculiar and grateful smell, which would indicate a distinct aromatic principle, but it has never been exhibited in the form of essential oil, or condensed in any smaller quantity by distillation or any other mode. To give wine all its aroma it should be fermented very slowly. 6. Colouring matter. The husk of the red grape contains a good colour, which is extracted when the entire fruit is pressed, and becomes dissolved in the wine when the fermentation is complete. Many substances will separate the colour. If lime-water is added to high-coloured wine a precipitate is formed of malat of lime that carries down with it all the colouring matter, which cannot again be separated either by water or alcohol. But if wine alone is evaporated gently to dryness, and the residue treated *with alcohol, the colouring* matter dissolves therein. We may add, too, that the natural colour of wine is entirely and speedily destroyed by the addition of hot well-burnt charcoal in pretty fine powder. The colour of red wine in the state in which we receive it is not entirely that of the grape, but is given by other colouring substances, which however are quite innoxious.

WINNOWING MACHINES. Machines of this sort are in pretty general use where thrashing-mills, to which they may be attached, are not erected; they are made on different principles according to particular circumstances.

WINTERA, a genus of plants of the class polyandria, and order pentagynia; and in the natural system arranged under the 12th order, holoraceæ. The calyx is three-lobed; there are six or twelve petals; there is no style; the fruit is a berry, which is club-shaped as well as the germen. Three species.

WIRE, a piece of metal drawn through the hole of an iron into a thread of a fineness answerable to the hole it passed through.

WITHERINGIA, a genus of plants of the class and order tetrandria monogynia. The corolla is sub-campanulate; calyx very small, four-toothed; perianthium two-celled. One species.

WITZENIA, a genus of plants of the class and order triandria monogynia. The corolla is one-petalled; stigma emarginate; capsule superior. One species.

WITHERNAM, in law, a writ that lies where a distress is driven out of the county, and the sheriff cannot make deliverance to the party distrained; in that case this writ is directed to the sheriff, commanding him to take as many of the beasts, or goods, of the party into his keeping, till he make deliverance of the first distress.

WITNESS, one who is sworn to give evidence in a cause. If a man is subpœnaed as a witness upon a trial, he must appear in court on pain of 100*l*. to be forfeited to the king, and 10*l*. together with damages equivalent to the loss sustained by the want of his evidence to the party aggrieved.

But witnesses ought to have a reasonable time, that their attendance upon the court may be of as little prejudice to themselves as possible; and the court of king's-bench held, that notice at two in the afternoon to attend the sitting that evening at Westminster was too short a time. Where a witness cannot be present at a trial, he may, by consent of the plaintiff and defendant, or by rule of court, be examined upon interrogatories at the judge's chambers. No witness is bound to appear to give evidence in a cause unless his reasonable expence is tendered him, nor need he appear till such charge is actually paid him, except he both resides and is summoned to give evidence within the bills of mortality.

WOLFRAM, an ore of tungsten, is found in different parts of Germany, in Sweden, Britain, France, and Spain; and almost constantly accompanied by ores of tin. It occurs both massive and crystallized. The primitive form of its crystals, is a rectangular parellelopiped, whose length is

bark, and forms by far the greatest p
the trunk and large branches of trees
consists of concentric layers, the nu
of which increases with the age of the

WOOF, among manufacturers,
threads which the weavers shoot a
with an instrument called the shuttle

WOOL, a kind of long, soft, curly
(see the article *Hair*), which cover
skin of several of the ruminating anin
but is particularly cut or shorn from
of the sheep.

WOOL-COMBERS. By 35 G. III
124, all those who have served an
prenticeship to the trade of a wool-co
er, or who are by law entitled to e
cise the same, and also their wives
children, may set up and exercise s
trade, or any other trade or busi
they are apt and able for, in any tow
place within this kingdom, without
molestation; nor shall they be remo
able from such place by the poor laws

WORD, in a military sense, signi
signal, token, order; as watch-wo

The WORD, } is a peculiar word
Watch WORD, } serves for a token
mark of distinction, given out in the
ders of the day in time of peace, but
war every evening in the field, by
general who commands, and in garri
by the governor, or other officer co
manding in chief, to prevent surpri
and hinder an enemy, or any treach
ous person, from passing backwards a
forwards.

WORD, in language, an articulate sou
representing some idea or conception
the mind. The copiousness of the Engl
language is proved by the following en
meration of the words in Johnson's Di
tionary:

Articles - - - - -
Nouns substantive - - - 204
Adjectives - - -

X.

Or x, the twenty-second letter of
our alphabet. In numerals it ex-
es 10, whence in old Roman manu-
is it is used for denarius; and as
seems to be made of two V's placed
over the other. When a dash is
d over it, thus $\overline{X}$, it signifies ten
and.

NTHE, a genus of plants of the class
rder dioecia syngenesia. The flow-
e dioecious; the calyx five-parted;
la 5-6 petalled. Two species.

NTHIUM, a genus of plants of the
monœcia, order pentandria, and ar-
d in the natural classification under
9th order, compositæ. The male
rs are composite, common calyx
cated; corollulæ monopetalous, tu-
, quinquefid. Female: calyx invo-
m of two leaves, containing two
rs; corolla 0; drupa dry, prickly;
us bilocular. Five species.

NTHIORZA, a genus of plants of
lass and order pentandria polyga-
There is no calyx; the petals five;
rines five, pedicelled; capsules
one-seeded. One species.

NTHOXYLUM, the tooth-ache tree,
us of plants of the class and order di-
pentandria. The calyx is five-part-
o corolla; fem. pist. five; capsules
one-seeded. One species.

RANTHEMUM, a genus of the syn-
ia polygamia superflua class of
s; the compound flower of which is
ual, and consists of many tubulous
aphrodite floscules placed on the
and also a few female tubulated
on the verge; the seeds are oblong,
ated, and contained in the cup.
nty-seven species.

MENIA, a genus of plants of the class
order pentandria monogynia. The
is a perianthium, composed of three
, cordated, and deciduous leaves;
orolla is formed of four petals, of a
anulated figure, divided at the edge
three erect, oblong, obtuse seg-
s; the germen is small, and of a
al figure; the fruit is an oval drupe,
ining one cell; the seed is oval, uni-
ar, and smooth. Three species.

XIPHIAS, in zoology, the sword-fish, a genus of fishes belonging to the order of apodes. The upper jaw terminates in a long sword-shaped rostrum, from which it is called the sword-fish: there are no teeth in the mouth; the gill membrane has eight rays; and the body is somewhat cylindrical. One species.

XIPHIDIUM, a genus of plants of the class and order triandria monogynia. The corolla is six-petalled, equal; capsules superior, three-celled, many seeded. One species.

XYLOCARPUS, a genus of plants of the class and order octandria monogynia. The calyx is four toothed; the corolla four petalled; nectarium eight-cleft; filaments inserted in nect.; drupe four or five-grooved; nuts eight or ten. One species.

XYLOMELUM, a genus of plants of the class and order tetrandria monogynia. The ament. is with a simple scale; petals four, staminiferous; stigma club-shaped, obtuse. One species.

XYLOPHYLLA, a genus of plants of the class and order pentandria trigynia. The calyx is five-parted, coloured; corolla none; one stigma, jagged; capsule three-celled; seeds, two. Seven species.

XYLOPIA, a genus of plants of the class and order polyandria polygynia. The calyx is three-leaved; petals six; capsule one or two seeded, four-cornered, two valved; seeds arilled. Three species.

XYLOSMA, a genus of plants of the class and order diœcia polyandria. The calyx is four or five parted; corolla none; male stamina twenty to fifty; female style scarcely any; stigma trifid; berry dry; seeds two, three-sided. Two species.

XYRIS, a genus of the triandria monogynia class of plants, the flower of which consists of three plain, patent, large, crenated petals, with narrow ungues, of the length of the cup. The fruit is a roundish, trilocular, trivalvular capsule, within the cup, with a great number of very small seeds. Four species.

Y.

The twenty-third letter of our al-
phabet. Y is a numeral, signifying
or according to Baronius, 159; and
a dash at top, as $\overline{Y}$, it signified
00.

CHT. This word is taken from the
. It is a small ship with one deck,
ng four, eight, or *twelve* guns, and
or forty men. Yachts, in general,
m thirty to 160 tons; contrived and

adorned both withinside and without, for carrying state passengers. They answer the purposes of business as well as pleasure, being remarkably good sailers.

YARDS *of a ship*, are those long pieces of timber which are made a little tapering at each end, and are fitted each athwart its proper mast, with the sails made fast to them, so as to be hoisted up, or lowered down, as occasion serves.

YARD-ARM is that half of the yard that

nutes, 49 seconds ; the quantity ass
by the authors of the Gregorian cal
is 365 days, 5 hours, 49 minutes. B
the civil or popular account, this yea
tains only 365 days ; except every
year, which contains 366.
Common civil year, is that consisti
365 days ; having seven months of th
one days each, four of thirty days,
one of twenty-eight days ; as indi
by the following well-known mem
verse :

Thirty days hath September,
April, June, and November ;
February twenty-eight alone,
And all the rest have thirty-on

Bissextile or leap-year, consists of
days, having one day extraordinary,
ed the intercalary, or bissextile
which takes place every fourth year.
YEAR AND DAY, is a time that de
mines a right in many cases ; and in s
works an usurpation, and in othe
prescription ; as in case of an estray, i
owner, proclamation being made, c
lenges it not within the time it is forfe
So is the year and day given in ca
appeal ; in case of descent after entr
claim, if no claim upon a fine or w
right at the common law : so
villain remaining in ancient deme
of a man sore bruised or wounded
protections ; essoins in respect of
king's service ; of a wreck ; and di
other cases.
YEAR DAY AND WASTE, is a p
the king's prerogative whereby he
lenges the profits of their lands and t
ments for a year and a day, that are
tainted of petty treason or felony ;
ever is lord of the manor where the l
or tenements belong ; and not only
but in the end may waste the tenem
destroy the houses, root up the w
gardens, and pasture, and plough u

esent they are often used
er, or ginger.
the oxyde of cobalt, em-
ing pottery-ware and co-
lour.
nus of the natural order
ament. is shobile shaped,
llen underneath; fem.
-shaped with scales at
erry solitary. Five spe-

LIA, horned pond-weed,
monœcia monandria class
ale flower of which con-
ngle stamen; it has nei-
corolla. In the female
is composed of a single
no corolla; the germina
the seeds, which are ob-
inated on both sides, are
species.
, the name of a genus of
rder diœcia, and class pen-
characters are these: it
rate male and female flow-
le flower the cup is a pe-
mposed of three leaves of
expanding every way, and
he flower; the flower is
but divided into five seg-
an open mouth; the seg-
ed, and are equal in size,
wards; the stamina are five
e length their end, and ter-
imple apices; the female
n separate plants, and have
lower the same as in the
the cup stands upon the
stil; this germen is oblong,
propagated three reflex co-
tigmata are bifid and curl-
long and very large berry
end, and very small at the
three cells, and has a
ar the apex; the seeds
f an oblong figure and
species.
rn, a genus of plants of
order triandria. The
aced on distinct spikes;
ous, beardless glume;
dless glume; the fe-
alve glume, as is the
one filiform, pendu-
are solitary and bu-
eceptacle. One spe-

nomy, the vertical
e heavens directly

one was first de-
in the Stockholm
It is sometimes
crystallized. The
stal is a rectangu-
ore squares. The
a long four-sided
low four sided

genus of fishes of
e head is com-
upper lip being
se membrane;
here are seven
and the body
es are eight.
ts of the class
nogynia. The

cal. is four-parted; petals four;
simple; caps. four; seeds arilled.
species.

ZINC, is of a brilliant white co
with a shade of blue, and is compos
a number of thin plates adhering
ther. When this metal is rubbed for s
time between the fingers, they acq
a peculiar taste, and emit a very p
ceptible smell. Its hardness is six an
half. When rubbed upon the fingers
tinges them of a black colour. Its sp
cific gravity, after it has been melted,
6. 861; after it has been compressed
1908; so that its density is increase
1.-20th.

ZINNIA, a genus of plants of the class syngenesia, order polygamia superflua; and in the natural system arranged under the 49th order, composita. The receptacle is paleaceous, the pappus consists of two erect awns, the calyx is ovato-cylindrical and imbricated; the rays consist of five persisting entire florets. Five species.

ZIRCON. This stone is brought from Ceylon, and found also in France and Spain, and other parts of Europe. It is commonly crystallized. The primitive form of its crystals is an octahedron, composed of two four-sided pyramids applied base to base; whose sides are isosceles triangles. The inclination of the sides of the same pyramid to each other is 124 deg. 12 min.; the inclination of the sides of one pyramid to those of another 82 deg. 50 min. The solid angle at the apex is 30 deg. 44 min. The varieties of the crystalline forms of zircon amount to seven. In some cases there is a four-sided prism interposed between the pyramids of the primitive form; sometimes all the angles of this prism are wanting, and two small triangular faces in place of each; sometimes the crystals are dodecahedrons, composed of a flat four-sided prism with hexagonal faces, terminated by four-sided summits with rhomboidal faces; sometimes the edges of this prism, sometimes the edges where the prism and summit join, and sometimes both together, are wanting, and we find small faces in their place.

ZIZANIA, a genus of plants of the class monœcia, order hexandria; and in the natural system arranged under the 4th order, gramina. There is no male calyx; the corolla is a bivalved beardless glume, intermixed with the female flowers; there is no female calyx; the corolla is an univalved, cucullated, and aristated glume; the style is bipartite, and there is one seed covered with the plaited corolla. Two species.

ZODIACAL *light*, a brightness sometimes observed in the zodiac, resembling that of the galaxy, or milky way. It appears at certain seasons, viz. towards the end of winter and in spring after sun-set, or before his rising in autumn and beginning of winter, resembling the form of a pyramid, lying lengthways with its axis along the zodiac, its base being placed obliquely with respect to the horizon.

ZOEGA, a genus of plants of the class syngenesia, and order polygamia frustranea. The receptacle is bristly; the pappus setaceous; the corollulæ of the radius ligulated; the calyx imbricated. One species.

29 min. The antients imagined the torrid zone uninhabitable. The temperate zones are two bands, environing the globe, and contained between the tropics and the polar circles; the breadth of each is 43 deg. 2 min. The frigid zones are segments of the surface of the earth, terminated, one by the antarctic, and the other by the arctic circle. The breadth of each is 46 deg. 58 min.

ZONITIS, a genus of insects of the order coleoptera. The generic character is antennæ testaceous; feelers four, filiform, jaw entire, longer than the feelers; lip emarginate. Eight species.

ZOOLOGY, is that part of natural history which relates to animals.

Linnæus divides the whole animal kingdom into six classes, viz.

Mammalia, includes all animals that suckle their young. *Aves*, or birds, *amphibia*, or amphibious animals. *Pisces*, or fishes. *Insecta*, or insects. *Vermes*, or worms. The first class, *Mammalia*, is subdivided into seven orders. See *Mammalia*.

The second class, *Aves*, is subdivided into six orders. See *Aves*.

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